AP5T

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AP5T
Mainboard

User's Guide

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FCC Class B Radio Frequency

Declaration of Conformity

This equipment has been tested and found to comply with the limits for a Class B Subassembly -CPU Board device, pursuant to Part 15 of FCC Rules. Operation is subject to the following two conditions: 1. This device may not cause harmful interference, and 2. This device must accept any interference received, including interference that may cause undesired operation.

Equipment Classification	: FCC Class B Subassembly - CPU Board
Type of Product	: Intel Pentium PCI/ISA AT Motherboard
CPU Frequencies	: 200/180/166/150/133/120/100/90 MHz
Chipset(s)	: Intel 430TX

AOpen **AP5T**

FC **Test To Comply With FCC Standards**

FOR HOME OR OFFICE USE

The limits of FCC Part 15 Class B are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/television technician for help.

Notice 1:

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2:

Shielded interface cables, if any, must be used in order to comply with emission limits.

Purpose and Scope

This manual tells how to install and configure the system board.

Organization

This manual consists of three chapters and one appendix:

Chapter 1, **Overview**, covers the introduction and specifications of the system board.

Chapter 2, **Hardware Installation** , describes hardware jumpers, connectors and memory configuration. There are user friendly drawings to locate jumper and connector.

Chapter 3, **AWARD BIOS**, explains the system BIOS and tells how to configure the system by setting the BIOS parameters.

Chapter 4, **Installing System Component** , includes 3D drawing and step by step procedures for first time DIY user to install the system board, CPU, SIMM/DIMM, cable and add expansion cards.

Appendix A, **Jumper Table Summary** , gives you a tabular summary of the jumper settings discussed in Chapter 2.

Appendix B, **Frequently Asked Question** , collects most frequently asked question of this product.

Appendix C, **Troubleshooting Guide** , includes first aid information you need if you meet trouble, the WWW address and worldwide service telephone/fax are also included.

Appendix D, **AOpen Best Products** , includes the best sale and recommended product specifications of AOpen.

Conventions

The following conventions are used in this manual:

`Text entered by user, default settings, recommended selections`	Represent text input by the user, default settings and recommended selections
<Enter>, <Tab>,<Ctl>, <Alt>, <Ins>, <Del>, etc	Represent the actual keys that you have to press on the keyboard.

Note:
Gives bits and pieces of additional information related to the current topic.

Warning:
Alerts you to any damage that might result from doing or not doing specific actions.

Caution:
Suggests precautionary measures to avoid potential hardware or software problems.

Important:
Reminds you to take specific action relevant to the accomplishment of the procedure at hand.

Tip:
Tells how to accomplish a procedure with minimum steps through little shortcuts.

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Appendix A Jumper Table Summary

Appendix B **Frequently Asked Question**

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Appendix D **AOpen Best Products**

Chapter 1

Overview

The AP5T is a high-performance Pentium®-based system board that utilizes the PCI/ISA architecture and **Baby AT** form factor. It integrates the Intel **82430TX** PCIset, a Super I/O controller, and a PCI mode 4 enhanced IDE controller with bus master and **Ultra DMA/33** to enhance system performance. It has **256KB** or **512KB** pipelined-burst second-level **cache onboard** and support four single in-line memory module (SIMM) plus two Dual in-line memory module (DIMM) that allow to **mix EDO and SDRAM** memory and expansion up to a maximum of 256MB. For the memory and IDE performance, the Intel 430TX chipset is currently the **fastest Pentium chipset** in the market.

Another feature that AP5T intends to implement is the new power management features of **Advanced Configuration Power Interface (ACPI).** The most attractive feature of ACPI for desktop user is probably **OnNow**, an idea from Notebook. You don't have to go through the entire boot process, into Win95, and back to your original work. Since ACPI specification is not fully defined yet. AP5T implements **Suspend to Hard Drive** by BIOS, from user point of view, it is the same as OnNow. Note that you have to use VESA compatible VGA (AOpen S3 PCI PV60/PT60), Sound Blaster compatible sound card (AOpen AW32/MP32), Rockwell compatible Modem (AOpen F34/MP32) for Suspend to Hard Drive to work properly.

Note: *ACPI is a specification of PC97, it is not fully defined yet. Although AOpen will try the best to support ACPI (normally, through BIOS modifications), it is still possible AP5T can not fully comply ACPI specification.*

There are also more features start to be implemented from AP5T-3.

Switching Power Regulator, Although Linear Regulator of AP5T-2 is good enough for AMD K6, AP5T-3 uses switching requlator to reserve the upgrade capability for new generation CPU.

Over-current Protection, AP5T-3 implements 3.3V (chipset, PBSRAM, SDRAM) and 2.8V (CPU core) over-current protection to prevent any accident short circuit and prevent system damage.

CPU Thermal Protection, When CPU temperature is higher than 55 degree C, the CPU speed will automatically slow down and there will be warning from BIOS and also ADM (AOpen Desktop Manager, similar as Intel LDCM), if ADM is installed.

The AP5T has also passed **FCC DoC test**, this means you can use any kind of housing with very low EMI radiation.

1.1 Specifications

Form Factor	Baby AT
Board Size	220 mm x 280 mm
CPU	Intel Pentium Processor P54C, PP/MT (P55C), AMD K5 and Cyrix 6x86
System Memory	FPM (Fast Page Mode) or EDO (Extended Data Output) 72-pin SIMM x4, and SDRAM 168-pin x2 maximum 256MB.
Second-level Cache	256KB or 512KB pipelined-burst cache onboard
Chipset	Intel 82430TX PCIset
Expansion Slots	ISA x3 and PCI x4
Serial Port	Two serial ports UART 16C550 compatible
Parallel Port	One parallel port supports standard parallel port (SPP), enhanced parallel port (EPP) or extended capabilities port (ECP).
Floppy Interface	Floppy interface supports 3.5 inches drives with 720KB, 1.44MB or 2.88MB format or 5.25 inches drives with 360KB, 1.2MB format
IDE Interface	Dual-channel IDE interface support maximum 4 IDE hard disks or CDROM, mode 4 , bus master hard disk drives and Ultra DMA/33 mode hard drives are also supported.
USB Interface	Two USB ports supported by USB bracket, the BIOS also supports USB driver to simulate legacy keyboard.
PS/2 Mouse	PS/2 mouse supported by PS/2 mouse bracket.
Keyboard	Default AT compatible keyboard, mini-DIN PS/2 keyboard connector is optional.
RTC and Battery	RTC build in Intel PIIX4 chipset, Lithium (CR-2032) battery.
BIOS	AWARD Plug-and-Play Flash ROM BIOS
Suspend to Hard Drive	Supported by BIOS, save your work to hard disk and resume within a very short time. VESA compatible VGA and Sound Blaster compatible sound card required.
Switching Regulator	High efficient switching regulator for future CPU.
Over-current Protection	3.3V 10A and 2.8V/2.9V (CPU core) 15A over-current protection to prevent any accident short circuit.
CPU Thermal Protection	Warning when CPU temperature is higher than 55 degree C.

Chapter 2

Hardware Installation

This chapter gives you a step-by-step procedure on how to install your system. Follow each section accordingly.

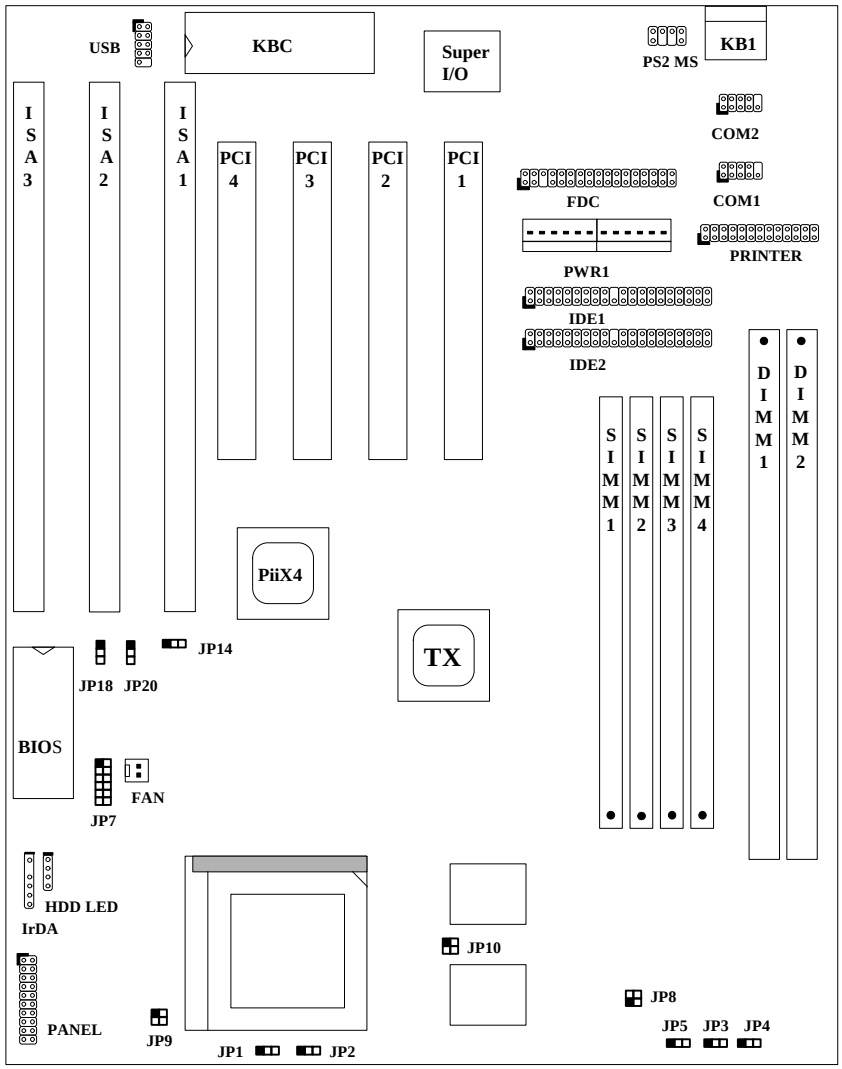
Caution: *Electrostatic discharge (ESD) can damage your processor, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component.*

1. *Do not remove a component from its protective packaging until you are ready to install it.*

2. *Wear a wrist ground strap and attach it to a metal part of the system unit before handling a component. If a wrist strap is not available, maintain contact with the system unit throughout any procedure requiring ESD protection.*

2.1 Jumper and Connector Locations

The following figure shows the locations of the jumpers and connectors on the system board:



Jumpers:

JP1,JP2:	*CPU frequency ratio*
JP3,JP4,JP5:	*CPU external (bus) clock*
JP7:	*CPU core voltage setting (Vcore)*
JP8:	*I/O voltage setting (Vio)*
JP9,JP10:	*CPU type (Single/Dual voltage, Vcpuio source selection.)*
JP14:	*Clear CMOS*
JP18:	*Onboard Super I/O enable/disable*
JP20:	*Onboard PS/2 mouse enable/disable*

Connectors:

KB1:	*AT keyboard connector*
PWR1:	*AT (PS/2) power connector*
PS2 MS:	*PS/2 mouse connector*
USB:	*USB connector*
COM1:	*COM1 connector*
COM2:	*COM2 connector*
FDC:	*Floppy drive connector*
PRINTER:	*Printer connector*
IDE1:	*IDE1 primary channel*
IDE2:	*IDE2 secondary channel*
FAN:	*CPU fan connector*
IrDA:	*IrDA (Infrared) connector*
HDD LED:	*HDD LED connector*
PANEL:	*Front panel (Multifunction) connector*

Note: JP5 *is used to select 75MHz and 83.3MHz, it is implemented from AP5T-2. For AP5T-1, just ignore JP5.*

2.2 Jumpers

Jumpers are made by pin headers and plastic connecting caps for the purpose of customizing your hardware. Doing so requires basic knowledge of computer hardware, be sure you understand the meaning of the jumpers before you change any setting. The onboard jumpers are normally set to their default with optimized settings.

On the mainboard, normally there is a bold line marked beside pin 1 of the jumper, sometimes, there are numbers also. If we connect (short) plastic cap to pin 1 and 2, we will say set it at 1-2, and when we say jumper is open, that means no plastic cap connected to jumper pins.

Open

Short

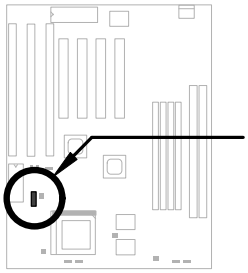
Jumper set at 1-2

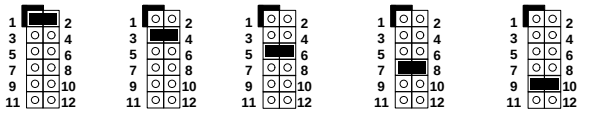
Jumper set at 2-3

2.2.1 Setting the CPU Voltage

JP7	CPU Core Voltage (Vcore)
1-2	3.45V (default for P54C)
3-4	3.52V (Cyrix or AMD)
5-6	2.9V (AMD K6-166/200)
7-8	2.8V (PP/MT P55C)
9-10	3.2V (AMD K6-233)
11-12	2.5V

JP7 is used to select CPU core voltage (Vcore), normally it is set to default 3.45V for INTEL Pentium P54C. It must be changed if you have CPU with different core voltage, such as INTEL PP/MT (P55C), AMD K5/K6 and Cyrix 6x86, refer to the CPU specification for more details.



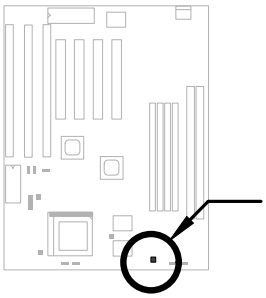


3.45V (P54C)	3.52V (6x86 or K5)	2.9V (K6-166/200)	2.8V (PP/MT P55C)	3.2V (K6-233)

Warning: *The heat dissipation of Intel PP/MT-233Hz, AMD K6-200/233MHz exceed the original design of this mainboard. Please make sure that you have installed CPU fan properly if Intel PP/MT-233 or AMD K6-200/233 is being selected to use. It may cause your system unstable if you can not meet the heat dissipation requirement from above CPU type. It is recommended to adopt larger fan on these CPU for better air flow in the system.*

JP8	I/O Voltage (Vio)
1-2	3.45V (default)
3-4	3.52V

JP8 is reserved for test only, which sets the voltage of onboard chipset and PBSRAM (Vio). When you are using dual voltage CPU, JP8 also provides CPU I/O voltage (Vcpuio).The default is 3.45V.



JP8

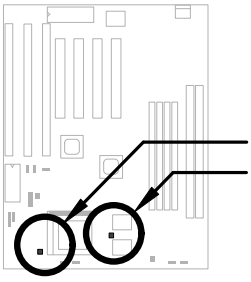
3.45V
(default)

JP8

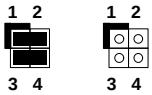
3.52V

JP9	JP10	CPU Type (Vcpuio)
1-2 & 3-4	Open	Single Voltage CPU Vcpuio = Vcore (default)
Open	1-2 & 3-4	Dual Voltage CPU Vcpuio = Vio (PP/MT P55C)

Set the jumper **JP9** and **JP10** according to the type of CPU. They are actually the selection of CPU I/O Voltage (Vcpuio). Normally, for single voltage CPU, Vcpuio is equal to Vcore, but for CPU that needs dual voltage such as PP/MT (P55C), Cyrix 6x86L, Vcpuio must be set to Vio, and it is different from Vcore.

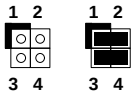


JP9 **JP10**



Single voltage
(Vcpuio = Vcore)

JP9 **JP10**



Dual voltage
(Vcpuio = Vio)

CPU Type	Vcore	Vio	Vcpuio	JP7	JP8	JP9	JP10
INTEL P54C	3.45V	3.45V	Vcore	1-2	1-2	1-2 &3-4	Open
INTEL PP/MT	2.8V	3.45V	Vio	7-8	1-2	Open	1-2 & 3-4
AMD K5	3.52V	3.45V	Vcore	3-4	1-2	1-2 & 3-4	Open
AMD K6-166/200	2.9V	3.45V	Vio	5-6	1-2	Open	1-2 & 3-4
AMD K6-233	3.2V	3.45V	Vio	9-10	1-2	Open	1-2 & 3-4
Cyrix 6x86	3.52V	3.45V	Vcore	3-4	1-2	1-2 &3-4	Open
Cyrix 6x86L	2.8V	3.45V	Vio	7-8	1-2	Open	1-2 & 3-4

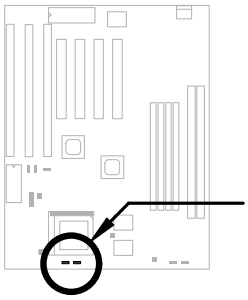
Caution: *Above table is possible settings of current CPU available on the market. The correct setting may vary because of new CPU product, refer to your CPU specification for more details.*

2.2.2 Selecting the CPU Frequency

JP1	JP2	CPU Frequency Ratio
1-2	1-2	1.5x (3.5x)
2-3	1-2	2x
2-3	2-3	2.5x (1.75x)
1-2	2-3	3x

Intel Pentium, Cyrix 6x86 and AMD K5 CPU are designed to have different Internal (Core) and External (Bus) frequency. The ratio of Core/Bus frequency is selected by **JP1** and **JP2**, which CPU is using to multiply external clock and produce internal frequency.

Core frequency = Ratio * External bus clock



JP1 & JP2

1 2 3 1 2 3

1.5x (3.5x)

JP1 & JP2

1 2 3 1 2 3

2x

JP1 & JP2

1 2 3 1 2 3

2.5x (1.75x)

JP1 & JP2

1 2 3 1 2 3

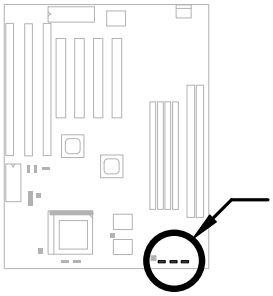
3x

Note: *Intel PP/MT 233MHz is using 1.5x jumper setting for 3.5x frequency ratio, and AMD PR166 is using 2.5x setting for 1.75x frequency ratio.*

JP5	JP3	JP4	CPU External Clock
1-2	1-2	2-3	60MHz
1-2	2-3	1-2	66MHz
2-3	1-2	2-3	75MHz
2-3	2-3	1-2	83.3MHz

JP5, JP3 and **JP4** are the selections of CPU external clock (bus clock), which is actually the clock from clock generator.

Note: JP5 *is used to select 75MHz and 83.3MHz, it is implemented from AP5T-2. For AP5T-1, just ignore JP5.*



Warning: *INTEL TX chipset supports only 60/66MHz external CPU bus clock, the 75/83.3MHz settings are for internal test only, set to 75/83.3MHz exceeds the specification of TX chipset, which may cause serious system damage.*

Caution: *Following table are possible settings of current CPU available on the market. The correct setting may vary because of new CPU product, refer to your CPU specification for more details.*

INTEL Pentium	CPU Core Frequency	Ratio	External Bus Clock	JP1 & JP2	JP5 & JP3 & JP4
P54C 90	90MHz =	1.5x	60MHz	1-2 & 1-2	1-2 & 1-2 & 2-3
P54C 100	100MHz =	1.5x	66MHz	1-2 & 1-2	1-2 & 2-3 & 1-2
P54C 120	120MHz =	2x	60MHz	2-3 & 1-2	1-2 & 1-2 & 2-3
P54C 133	133MHz =	2x	66MHz	2-3 & 1-2	1-2 & 2-3 & 1-2
P54C 150	150MHz =	2.5x	60MHz	2-3 & 2-3	1-2 & 1-2 & 2-3
P54C 166	166MHz =	2.5x	66MHz	2-3 & 2-3	1-2 & 2-3 & 1-2
P54C 200	200MHz =	3x	66MHz	1-2 & 2-3	1-2 & 2-3 & 1-2

INTEL Pentium	CPU Core Frequency	Ratio	External Bus Clock	JP1 & JP2	JP5 & JP3 & JP4
PP/MT 150	150MHz =	2.5x	60MHz	2-3 & 2-3	1-2 & 1-2 & 2-3
PP/MT 166	166MHz =	2.5x	66MHz	2-3 & 2-3	1-2 & 2-3 & 1-2
PP/MT 200	200MHz =	3x	66MHz	1-2 & 2-3	1-2 & 2-3 & 1-2
PP/MT 233	233MHz =	3.5x	66MHz	1-2 & 1-2	1-2 & 2-3 & 1-2

Cyrix 6x86 & 6x86L	CPU Core Frequency	Ratio	External Bus Clock	JP1 & JP2	JP5 & JP3 & JP4
P150+	120MHz =	2x	60MHz	2-3 & 1-2	1-2 & 1-2 & 2-3
P166+	133MHz =	2x	66MHz	2-3 & 1-2	1-2 & 2-3 & 1-2

AMD K5	CPU Core Frequency	Ratio	External Bus Clock	JP1 & JP2	JP5 & JP3 & JP4
PR90	90MHz =	1.5x	60MHz	1-2 & 1-2	1-2 & 1-2 & 2-3
PR100	100MHz =	1.5x	66MHz	1-2 & 1-2	1-2 & 2-3 & 1-2
PR120	90MHz =	1.5x	60MHz	1-2 & 1-2	1-2 & 1-2 & 2-3
PR133	100MHz =	1.5x	66MHz	1-2 & 1-2	1-2 & 2-3 & 1-2
PR166	116MHz =	1.75x	66MHz	2-3 & 2-3	1-2 & 2-3 & 1-2

AMD K6	CPU Core Frequency	Ratio	External Bus Clock	JP1 & JP2	JP5 & JP3 & JP4
PR2-166	166MHz =	2.5x	66MHz	2-3 & 2-3	1-2 & 2-3 & 1-2
PR2-200	200MHz =	3x	66MHz	1-2 & 2-3	1-2 & 2-3 & 1-2
PR2-233	233MHz =	3.5x	66MHz	1-2 & 1-2	1-2 & 2-3 & 1-2

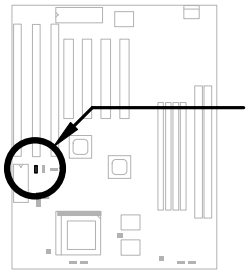
Note: *Cyrix 6x86 and AMD K5 CPU use P-rating for the reference of CPU benchmark compared with INTEL P54C, their internal core frequency is not exactly equal to P-rating marked on the CPU. For example, Cyrix P166+ is 133MHz but performance is almost equal to P54C 166MHz and AMD PR133 is 100MHz but performance is almost equal to INTEL P54C 133MHz.*

Note: *INTEL TX chipset does not support CPU with 50/55MHz external bus clock, so that INTEL P54C 75MHz, Cyrix P120+,P133+ and AMD PR75 are not supported by this mainboard.*

2.2.3 Disabling the Onboard Super I/O Controller

JP18	Onboard Super I/O
1-2	Enable (default)
2-3	Disable

The board is default to enable the onboard Super I/O controller. In case you wish to use an external I/O control card, you need to disable the onboard I/O before using the external I/O card. To disable it, set the jumper **JP18** to 2-3.



JP18

Enable (default)

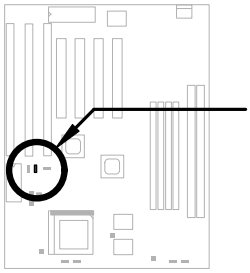
JP18

Disable

2.2.4 Disabling the PS/2 Mouse Function

JP20	PS/2 Mouse
1-2	Enable (default)
2-3	Disable

The PS/2 mouse function is normally enabled and occupies IRQ12. To reassign IRQ12 for other function, disable the PS/2 mouse function by setting the jumper **JP20** to 2-3**.**



JP20

Enable (default)

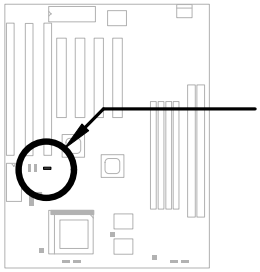
JP20

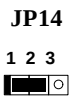
Disable

2.2.5 Clearing the CMOS

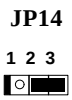
JP14	Clear CMOS
1-2	Normal operation (default)
2-3	Clear CMOS

You need to clear the CMOS if you forget your system password. To clear the CMOS, follow the procedures listed below:





Normal Operation (default)



Clear CMOS

The procedure to clear CMOS:

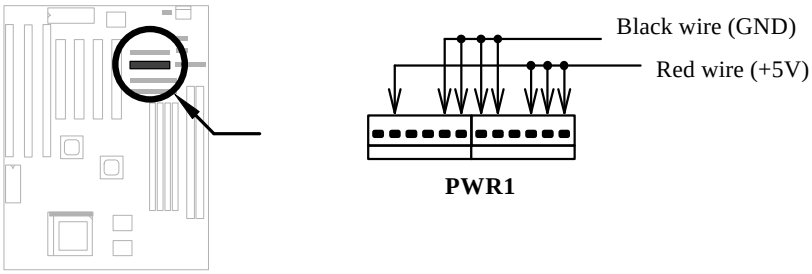
1. Turn off the system power.
2. Locate **JP14** and short pins 2-3 for a few seconds.
3. Return **JP14** to its normal setting by shorting pins 1-2.
4. Turn on the system power.
5. Press DEL during bootup to enter the BIOS Setup Utility and specify a new password, if needed.

2.3 Connectors

2.3.1 Power Cable

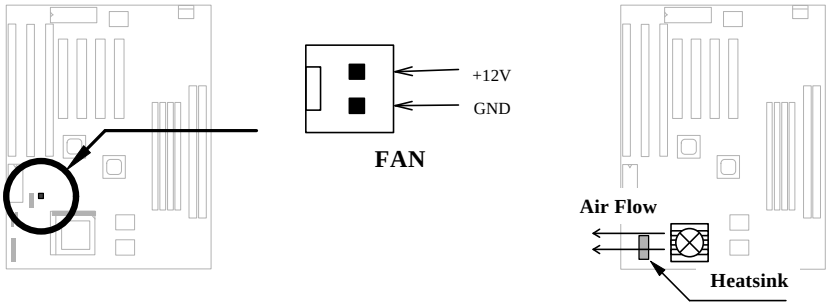
A standard baby AT (PS/2) power supply has two cables with six wires on each. Plug in these cables to the onboard power connector in such a way that all the black wires are in the center. The power connector is marked as **PWR1** on the system board.

Caution: *Make sure that the power supply is off before connecting or disconnecting the power cable.*



2.3.2 CPU Fan

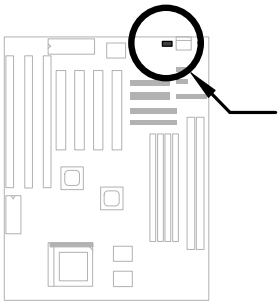
Plug in the fan cable to the two-pin fan connector onboard. The fan connector is marked **FAN** on the system board. Attach the heatsink and fan to the CPU. Check its orientation, make sure the air flow go through the heatsink.

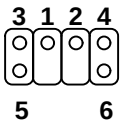


2.3.3 PS/2 Mouse

To connect a PS/2 mouse, insert the PS/2 mouse bracket connector to **PS2 MS** on the system board. Then plug in the PS/2 mouse cable to the mouse port on the bracket.

Pin	Description
1	MS DATA
2	NC
3	GND
4	+5V
5	MS CLK
6	NC

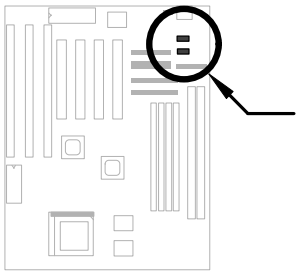


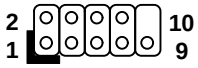


PS2 MS

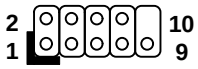
2.3.4 Serial Devices (COM1/COM2)

To support serial devices, insert the serial device connector into the serial port on the bracket. Plug in the 10-pin flat cable to the appropriate onboard connectors. The serial port 1 connector is marked as **COM1** and the serial port 2 connector is marked as **COM2** on the system board.





COM2

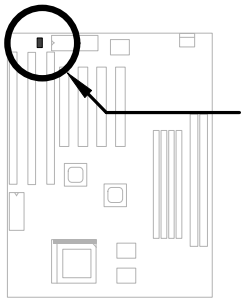


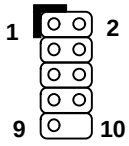
COM1

2.3.5 USB Device (optional)

You need a USB bracket to have your system to support additional USB device(s). To attach a USB bracket, simply insert the bracket cable to the onboard USB connector marked as **USB.**

Pin	Description	Pin	Description
1	V0	2	V1
3	D0-	4	D1-
5	D0+	6	D1+
7	GND	8	GND
9	NC	10	NC

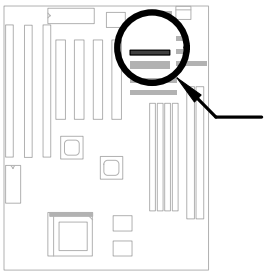


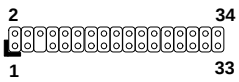


USB

2.3.6 Floppy Drive

Connect the 34-pin floppy drive cable to the floppy drive connector marked as **FDC** on the system board.

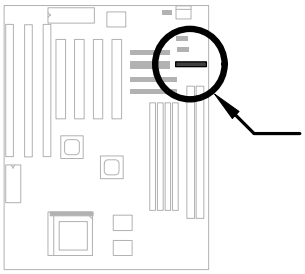


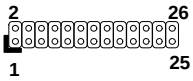


FDC

2.3.7 Printer

Plug in the 26-pin printer flat cable to the onboard parallel connector marked as **PRINTER** on the board.





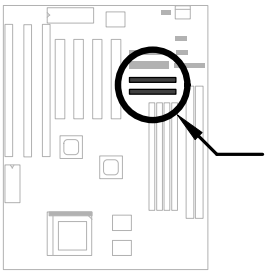
PRINTER

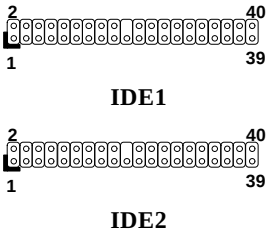
2.3.8 IDE Hard Disk and CD ROM

This mainboard supports two 40 pin IDE connectors marked as **IDE1** and **IDE2.** IDE1 is also known as primary channel and IDE2 as secondary channel, each channel supports two IDE devices that makes total of four devices.

In order to work together, the two devices on each channel must be set differently to master and slave mode, either one can be hard disk or CDROM. The setting as master or slave mode depends on the jumper on your IDE device, please refer to your hard disk and CDROM manual accordingly.

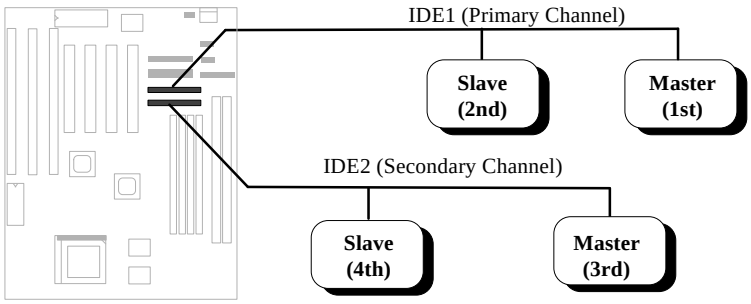
Connect your first IDE hard disk to master mode of the primary channel. If you have second IDE device to install in your system, connect it as slave mode on the same channel, and the third and fourth device can be connected on secondary channel as master and slave mode respectively.





Caution: *The specification of IDE cable is maximum 46cm (18 inches), make sure your cable does not excess this length.*

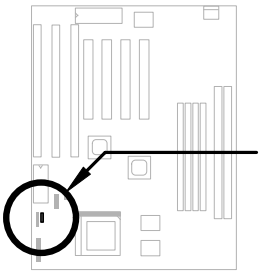
Caution: *For better signal quality, it is recommended to set far end side device to master mode and follow the suggested sequence to install your new device . Please refer to following figure.*

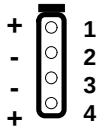


2.3.9 Hard Disk LED

The HDD LED connector is marked as **HDD LED** on the board. This connector is designed for different type of housing, actually only two pins are necessary for the LED. If your housing has four pin connector, simply plug it in. If you have only two pin connector, please connect to pin 1-2 or pin 3-4 according to the polarity.

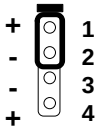
Pin	Description
1	HDD LED
2	GND
3	GND
4	HDD LED





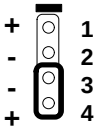
HDD LED

4-pin connector



HDD LED

2-pin connector at pin 1-2



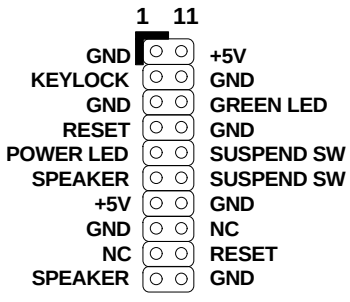
HDD LED

2-pin connector at pin 3-4

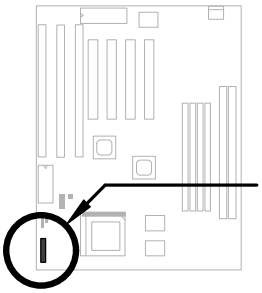
2.3.10 Panel Connector

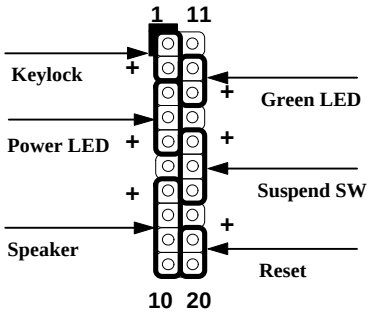
The Panel (multifunction) connector is a 20-pin connector marked as **PANEL** on the board. Attach the power LED, keylock, speaker, reset switch, suspend switch, and green mode LED connectors to the corresponding pins as shown in the figure.

Some housings have a five-pin connector for the keylock and power LED Since power LED and keylock are aligned together, you can still use this kind of connector.



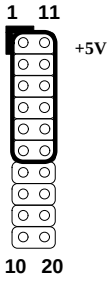
PANEL





PANEL

Other housings may have a 12-pin connector. If your housing has this type of connector, connect it to PANEL as shown in the figure. Make sure that the red wire of the connector is connected to +5V.



PANEL

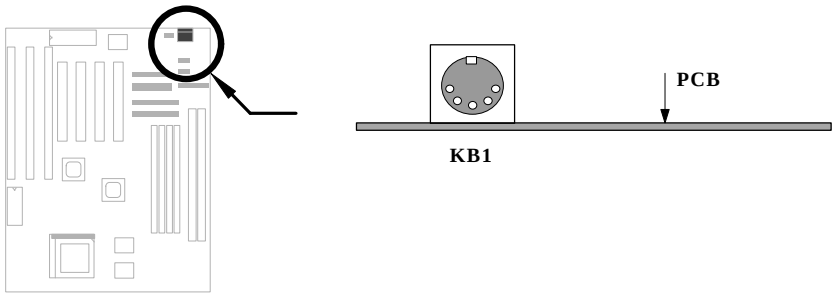
Note: *If your housing comes with Turbo switch and Turbo LED connectors, you may use these connectors for Suspend switch and Green mode LED functions, respectively.*

Note*: Pressing the Suspend switch allows you to manually force the system to suspend mode. However, this is possible only if the Power Management function in the BIOS Setup menu is enabled.*

2.3.11 Keyboard

The onboard keyboard connector is a five-pin AT-compatible connector marked as **KB1**. The view angle of drawing shown here is from back panel of the housing.

***Note**: The mini DIN PS/2 keyboard connector is optional.*



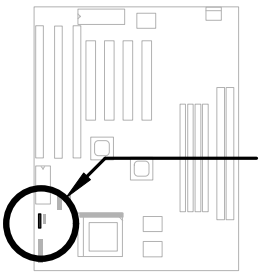
2.3.12 IrDA Connector

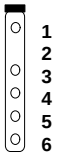
Serial port 2 can be configured to support wireless infrared module, with this module and application software such as Laplink, user can transfer files to or from laptops, notebooks, PDA and printers. This mainboard supports IrDA (115Kbps, 1 meter) as well as ASK-IR (19.2Kbps).

Install infrared module onto **IrDA** connector and enable infrared function from BIOS setup, make sure to have correct orientation when you plug onto IrDA connector.

Pin	Description
1	+5V
2	NC
3	IRRX
4	GND
5	IRTX
6	+3.3V

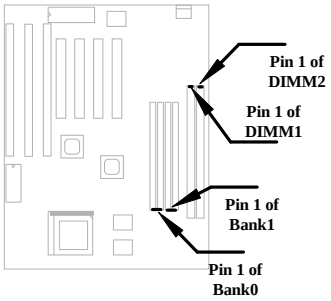
***Note**: Onboard serial port 2 (COM2) will not be available after IrDA connector is enabled.*





IrDA

2.4 Configuring the System Memory



This mainboard has four 72 pin SIMM sockets (Single-in-line Memory Module) and two 168 pin DIMM socket (Dual-in-line Memory Module) that allow you to install system memory from minimum 8MB up to maximum 256MB.

The SIMM supported by this mainboard can be identified by 4 kinds of factors:

- Size: single side, 1Mx32 (4MB), 4Mx32 (16MB), 16Mx32 (64MB), and double side, 1Mx32x2 (8MB), 4Mx32x2 (32MB), 16Mx32x2 (128MB).
- Speed: 60ns or 70ns access time
- Type: FPM (Fast page mode) or EDO (Extended data output)
- Parity: without parity (32 bit wide) or with parity (36 bit wide).

The DIMM supported by this mainboard are always 64-bit wide SDRAM.

- Size: single side, 1Mx64 (8MB), 2Mx64 (16MB), 4Mx64 (32MB), 8Mx64 (64MB), 16Mx64 (128MB), and double side, 1Mx64x2 (16MB), 2Mx64x2 (32MB), 4Mx64x2 (64MB), 8Mx64x2 (128MB), 16Mx64x2 (256MB).
- Speed: normally marked -67, which means synchronous to maximum 67MHz.
- Parity: without parity (32 bit wide)

Because Pentium processor has 64 bit bus width, the four SIMM sockets are arranged in two banks of two sockets each, they are Bank0 and Bank1. Both SIMMs in each bank must be in the same size and type. It is allowed to have different speed and type in different bank, for example, 70ns FPM in one bank and 60ns EDO in another bank, in such case, each bank is independently optimized for maximum performance. The memory timing requires at least 70ns fast page mode DRAM chip, but for optimum performance, 60ns EDO DRAM is recommended.

***Warning**: The default memory timing setting is 60ns to obtain the optimal performance. Because of the specification limitation, 70ns SIMM is recommended to*

be used only for CPU external clock 60MHz.

Tip: *EDO DRAM is designed to improve the DRAM read performance. Unlike traditional fast page mode, that tri-states the memory output data to start the precharge activity, EDO DRAM holds the memory data valid until the next memory access cycle, which is similar to pipe-line effect and reduces one clock state.*

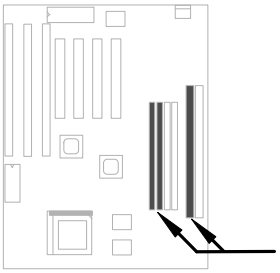
There is no jumper setting required for the memory size or type. It is automatically detected by the system BIOS. You can use any single side SIMM and DIMM combination list below for BANK0/BANK1 or DIMM socket, and the total memory size is to add them together, the maximum is 256MB.

SIMM1	SIMM2	Subtotal of Bank0
None	None	0MB
4MB	4MB	8MB
8MB	8MB	16MB
16MB	16MB	32MB
32MB	32MB	64MB
64MB	64MB	128MB
128MB	128MB	256MB

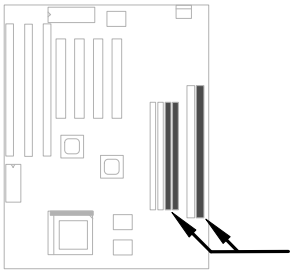
DIMM1	Size of DIMM1
None	0MB
8MB	8MB
16MB	16MB
32MB	32MB
64MB	64MB
128MB	128MB
256MB	256MB

Total Memory Size = Subtotal of Bank0 + Subtotal of Bank1 + Size of DIMM1 + Size of DIMM2

For double side memory module, there is one limitation. This mainboard supports only 4 RAS# (Row address latch) signals for DRAM control. They can only be occupied by one DRAM module, they can not be shared. **The simple rule is: If double side module at either Bank0 or DIMM1, the other must be empty** . If you use at DIMM1, Bank0 must be empty. **Bank1 and DIMM2 have the same limitation**.



Double side module at either Bank0 or DIMM1, the other must be empty.



Double side module at either Bank1 or DIMM2, the other must be empty.

Type and Location	RAS0#	RAS1#
Single side SIMM at Bank0	Occupied	
Double side SIMM at Bank0	Occupied	Occupied
Single side DIMM at DIMM1		Occupied
Double side DIMM at DIMM1	Occupied	Occupied

Type and Location	RAS2#	RAS3#
Single side SIMM at Bank1	Occupied	
Double side SIMM at Bank1	Occupied	Occupied
Single side DIMM at DIMM2		Occupied
Double side DIMM at DIMM2	Occupied	Occupied

Caution: *Make sure that you install the same SIMM type and size for each bank.*

Caution: *There are some old DIMMs made by EDO or FPM memory chip, they can only accept 5V power and probably can not fit into the DIMM socket, make sure you have 3.3V true SDRAM DIMM before your insert it.*

Tip: *If you have DIMM made by 3V EDO, it is possible that TX chipset can support it. But because it is so rare, the only 3V EDO DIMM had been tested by this*

mainboard is Micron MT4LC2M8E7DJ-6.

***Warning**: Do not use SIMM and SDRAM DIMM together unless you have 5V tolerance SDRAM (such as Samsung or TI). The FPM/EDO operate at 5V while SDRAM operates at 3.3V. If you combine them together the system will temporary work fine; however after a few months, the SDRAM 3.3V data input will be damaged by 5V FPM/EDO data output line.*

There is an important parameter affects SDRAM performance, CAS Latency Time. It is similar as CAS Access Time of EDO DRAM and is calculated as number of clock state. The SDRAM that AOpen had tested are listed below. If your SDRAM has unstable problem, go into BIOS "Chipset Features Setup", change CAS Latency Time to 3 clocks.

Manufacturer	Model	Suggested CAS Latency Time	5V Tolerance
Samsung	KM416S1120AT-G12	2	Yes
NEC	D4516161G5-A12-7JF	2	No
Micron	MT4LC1M16E5TG-6	2	No
TI	TMS626162DGE -15	2	Yes
TI	TMS626162DGE M-67	3	Yes

The driving capability of new generation chipset is limited because the lack of memory buffer (to improve performance). This makes DRAM chip count an important factor to be taking into consideration when you install SIMM/DIMM. Unfortunately, there is no way that BIOS can identified the correct chip count, you need to calculate the chip count by yourself. The simple rule is: By visual inspection, use only SIMM with chip count less than 24 chips, and use only DIMM which is less than 16 chips.

***Warning**: Do not install any SIMM that contains more than 24 chips. SIMMs contain more than 24 chips exceed the INTEL chipset driving specification. Doing so may result in unstable system behavior.*

***Warning**: Although Intel TX chipset supports x4 SDRAM chip. Due to loading issue, it is not recommended to use this kind of SDRAM.*

***Tip:** The SIMM/DIMM chip count can be calculated by following example:*

1. *For 32 bit non-parity SIMM using 1M by 4 bit DRAM chip, 32/4=8 chips.*
2. *For 36 bit parity SIMM using 1M by 4 bit DRAM chip, 36/4=9 chips.*
3. *For 36 bit parity SIMM using 1M by 4 bit and 1M by 1 bit DRAM, the chip count will be 8 data chips(8= 32/4) plus 4 parity chips(4=4/1), total is 12 chips.*
4. *For 64 bit DIMM using 1M by 16 bit SDRAM, the chip count is 64/16=4 chips.*

Following table list the recommended DRAM combinations of SIMM and DIMM:

SIMM Data chip	SIMM Parity chip	Bit size per side	Single/ Double side	Chip count	SIMM size	Recommended
1M by 4	None	1Mx32	x1	8	4MB	Yes
1M by 4	None	1Mx32	x2	16	8MB	Yes
1M by 4	1M by 1	1Mx36	x1	12	4MB	Yes
1M by 4	1M by 4	1Mx36	x1	9	4MB	Yes
1M by 4	1M by 4	1Mx36	x2	18	8MB	Yes
1M by 16	None	1Mx32	x1	2	4MB	Yes
1M by 16	None	1Mx32	x2	4	8MB	Yes
1M by 16	1M by 4	1Mx36	x1	3	4MB	Yes
1M by 16	1M by 4	1Mx36	x2	6	8MB	Yes
4M by 4	None	4Mx32	x1	8	16MB	Yes
4M by 4	None	4Mx32	x2	16	32MB	Yes
4M by 4	4M by 1	4Mx36	x1	12	16MB	Yes
4M by 4	4M by 1	4Mx36	x2	24	32MB	Yes

SIMM Data chip	SIMM Parity chip	Bit size per side	Single/ Double side	Chip count	SIMM size	Recommended
16M by 4	None	16Mx32	x1	8	64MB	Yes, but not tested.
16M by 4	None	16Mx32	x2	16	128MB	Yes, but not tested.
16M by 4	16M by 4	16Mx36	x1	9	64MB	Yes, but not tested.
16M by 4	16M by 4	16Mx36	x2	18	128MB	Yes, but not tested.

DIMM Data chip	Bit size per side	Single/ Double side	Chip count	DIMM size	Recommended
1M by 16	1Mx64	x1	4	8MB	Yes
1M by 16	1Mx64	x2	8	16MB	Yes
2M by 8	2Mx64	x1	8	16MB	Yes
2M by 8	2Mx64	x2	16	32MB	Yes

DIMM Data chip	Bit size per side	Single/ Double side	Chip count	DIMM size	Recommended
2M by 32	2Mx64	x1	2	16MB	Yes, but not tested.
2M by 32	2Mx64	x2	4	32MB	Yes, but not tested.
4M by 16	4Mx64	x1	4	32MB	Yes, but not tested.
4M by 16	4Mx64	x2	8	64MB	Yes, but not tested.
8M by 8	8Mx64	x1	8	64MB	Yes, but not tested.
8M by 8	8Mx64	x2	16	128MB	Yes, but not tested.

***Warning**: 64MB SIMMs using 16M by 4 bit chip (64M bit technology) are not available in the market and are not formally tested by AOpen quality test department yet. However they are supported by design specification from Intel and they will be tested as soon as they are available. Note that 64MB SIMMs using 16M by 1 bit chip (16M bit technology) have chip count exceed 24 and are strongly not recommended.*

***Tip:** 8 bit = 1 byte, 32 bit = 4 byte. The SIMM size is represented by number of data byte (whether with or without parity), for example, the size of single side SIMM*

using 1M by 4 bit chip is 1Mx32 bit, that is, 1M x 4 byte= 4MB. For double side SIMM, simply multiply it by 2, that is, 8MB.

Following table are possible DRAM combinations that is **NOT** recommended:

SIMM Data chip	SIMM Parity chip	Bit size per side	Single/ Double side	Chip count	SIMM size	Recommended
1M by 1	None	1Mx32	x1	32	4MB	No
1M by 1	1M by 1	1Mx36	x1	36	4MB	No
1M by 4	1M by 1	1Mx36	x2	24	8MB	No
4M by 1	None	4Mx32	x1	32	16MB	No
4M by 1	4M by 1	4Mx36	x1	36	16MB	No
16M by 1	None	16Mx32	x1	32	64MB	No
16M by 1	16M by 1	16Mx36	x1	36	64MB	No

DIMM Data chip	Bit size per side	Single/ Double side	Chip count	DIMM size	Recommended
4M by 4	4Mx64	x1	16	32MB	No
4M by 4	4Mx64	x2	32	64MB	No
16M by 4	16Mx64	x1	16	128MB	No
16M by 4	16Mx64	x2	32	256MB	No

Memory error checking is supported by parity check. To use parity check you need 36 bit SIMM (32 bit data + 4 bit parity), which are automatically detected by BIOS.

Tip: *The parity mode uses 1 parity bit for each byte, normally it is even parity mode, that is, each time the memory data is updated, parity bit will be adjusted to have even count "1" for each byte. When next time, if memory is read with odd number of "1", the parity error is occurred and this is called single bit error detection.*

Chapter 3

Award BIOS

This chapter tells how to configure the system parameters. You may update your BIOS via AWARD Flash Utility.

Important: *Because the BIOS code is the most often changed part of the mainboard design, the BIOS information contained in this chapter (especially the Chipset Setup parameters) may be a little different compared to the actual BIOS that came with your mainboard.*

3.1 Entering the Award BIOS Setup Menu

The BIOS setup utility is a segment of codes/routines residing in the BIOS Flash ROM. This routine allows you to configure the system parameters and save the configuration into the 128 byte CMOS area, (normally in the RTC chip or directly in the main chipset). To enter the BIOS Setup, press DEL during POST (Power-On Self Test). The BIOS Setup Main Menu appears as follows.

```
ROM PCI/ISA BIOS (XXXXXXXX)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.
```

STANDARD CMOS SETUP	INTEGRATED PERIPHRALS
BIOS FEATURES SETUP	PASSWORD SETTING
CHIPSET FEATURES SETUP	IDE HDD AUTO DETECTION
POWER MANAGEMENT SETUP	SAVE & EXIT SETUP
PNP/PCI CONFIGURATION SETUP	EXIT WITHOUT SAVING
LOAD SETUP DEFAULTS	
LOAD TURBO DEFAULTS	
ESC : Quit	↑ ↓ → ← : Select Item
F10 : Save & Exit Setup	(Shift) F2 : Change Color
Description of each function	

***Tip**: Choose "Load Setup Defaults" for recommended optimal performance. Choose "Load Turbo Defaults" for best performance with light system loading. Refer to section 3.7.*

The section at the bottom of the screen tells how to control the screen. Use the arrow keys to move between items, SHIFT F2 to color scheme of the display, ESC to exit, and F10 to save the changes before exit. Another section at the bottom of the screen displays a brief description of the highlighted item.

After selecting an item, press ENTER to select or enter a submenu.

3.2 Standard CMOS Setup

The "Standard CMOS Setup" sets the basic system parameters such as the date, time, and the hard disk type. Use the arrow keys to highlight an item and PGUP or PGDN to select the value for each item.

```
                ROM PCI/ISA BIOS (XXXXXXXX)
                STANDARD CMOS SETUP
                AWARD SOFTWARE, INC.

Date (mm:dd:yy)  :  Wed.  Mar  6  1996
Time (hh:mm:ss)  :  00:00:00

HARD DISK         TYPE     SIZE    CYLS   HEAD   PRECOMP   LANDZ   SECTORS   MODE
Primary Master  : Auto        0       0      0         0       0         0   AUTO
Primary Slave   : Auto        0       0      0         0       0         0   AUTO
Secondary Master: Auto        0       0      0         0       0         0   AUTO
Secondary Slave : Auto        0       0      0         0       0         0   AUTO

Drive A :  1.44M, 3.5 in
Drive B :  None

Video   :  EGA/VGA
Halt On :  All Errors

                                    Base Memory :    640 K
                                  Extended Memory:   15360 K
                                    Other Memory :     384 K
                                   Total Memory :   16384 K

 ESC  :  Quit                  ↑ ↓ → ← :  Select Item
 F10  :  Save & Exit Setup    (Shift) F2  :  Change Color
```

Standard CMOS → Date

To set the date, highlight the Date parameter. Press PGUP or PGDN to set the current date. The date format is month, date, and year.

Standard CMOS → Time

To set the time, highlight the Time parameter. Press PGUP or PGDN to set the current time in hour, minute, and second format. The time is based on the 24 hour military clock.

Standard CMOS→ Primary Master→ Type
Standard CMOS→ Primary Slave→ Type
Standard CMOS→ Secondary Master→ Type
Standard CMOS→ Secondary Slave→ Type

Type
Auto
User
None
1
2
...
45

This item lets you select the IDE hard disk parameters that your system supports. These parameters are Size, Number of Cylinder, Number of Head, Start Cylinder for Pre-compensation, Cylinder number of Head Landing Zone and Number of Sector per Track. The default setting is **Auto**, which enables BIOS to automatically detect the parameters of installed HDD at POST (Power-On Self Test). If you prefer to enter HDD parameters manually, select User. Select None if no HDD is connected to the system.

The IDE CDROM is always automatically detected.

Tip: *For an IDE hard disk, we recommend that you use the "IDE HDD Auto Detection" to enter the drive specifications automatically. See the section "IDE HDD Auto Detection".*

Standard CMOS→ Primary Master→ Mode
Standard CMOS→ Primary Slave→ Mode
Standard CMOS→ Secondary Master→ Mode
Standard CMOS→ Secondary Slave→ Mode

Mode
Auto
Normal
LBA
Large

The enhanced IDE feature allows the system to use a hard disk with a capacity of more than 528MB. This is made possible through the Logical Block Address (LBA) mode translation. The LBA is now considered as a standard feature of current IDE hard disk on the market because of its capability to support capacity larger than 528MB. Note that if HDD is formatted with LBA On, it will not be able to boot with LBA Off.

Standard CMOS→ Drive A
Standard CMOS→ Drive B

Drive A
None
360KB 5.25"
1.2MB 5.25"
720KB 3.5"
1.44MB 3.5"
2.88MB 3.5"

These items select floppy drive type. The available settings and types supported by the mainboard are listed on the left.

Standard CMOS → Video

Video
EGA/VGA
CGA40
CGA80
Mono

This item specifies the type of video card in use. The default setting is VGA/EGA . Since current PCs use VGA only, this function is almost useless and may be disregarded in the future.

Standard CMOS → Halt On

Halt On
No Errors
All Errors
All, But Keyboard
All, But Diskette
All, But Disk/Key

This parameter enables you to control the system stops in case of Power-On Self Test (POST) error.

3.3 BIOS Features Setup

This screen appears when you select the option "BIOS Features Setup" from the main menu.

```
ROM PCI/ISA BIOS (XXXXXXXX)
BIOS FEATURES SETUP
AWARD SOFTWARE, INC.
```

Virus Warning	: Disabled	Video BIOS Shadow	: Enabled
External Cache	: Enabled	C8000-CBFFF Shadow	: Disabled
Quick Power On Self Test	: Enabled	CC000-CFFFF Shadow	: Disabled
Boot Sequence	: A,C,SCSI	D0000-D3FFF Shadow	: Disabled
Swap Floppy Drive	: Disabled	D4000-D7FFF Shadow	: Disabled
Boot Up Floppy Seek	: Disabled	D8000-DBFFF Shadow	: Disabled
Boot Up NumLock Status	: ON	DC000-DFFFF Shadow	: Disabled
Boot Up System Speed	: High		
Typematic Rate Setting	: Disabled		
Typematic Rate (Chars/Sec)	: 6	ESC: Quit	↑↓→← : Select Item
Typematic Delay (Msec)	: 250	F1 : Help	PU/PD/+/- : Modify
Security Option	: Setup	F5 : Old Values	(Shift) F2 : Color
PCI/VGA Palette Snoop	: Disabled	F6 : Load Setup Defaults	
OS Select for DRAM > 64MB	: Non-OS/2	F7 : Load Turbo Defaults	

BIOS Features→ Virus Warning

Virus Warning
Enabled
Disabled

Set this parameter to Enabled to activate the warning message. This feature protects the boot sector and partition table of your hard disk from virus intrusion.

Any attempt during boot up to write to the boot sector of the hard disk drive stops the system and the following warning message appears on the screen. Run an anti-virus program to locate the problem.

```
! WARNING !
Disk Boot Sector is to be modified
Type "Y" to accept write, or "N" to abort write
Award Software, Inc.
```

BIOS Features → External Cache

External Cache
Enabled
Disabled

Enabling this parameter activates the secondary cache (currently, PBSRAM cache). Disabling the parameter slows down the system. Therefore, we recommend that you leave it enabled unless you are troubleshooting a problem.

BIOS Features → Power-On Self-Test

Quick Power-on Self-test
Enable
Disabled

This parameter speeds up POST by skipping some items that are normally checked.

BIOS Features → Boot Sequence

Boot Sequence
A,C,SCSI
C,A,SCSI
C,CDROM,A
CDROM,C,A
D,A,SCSI
E,A,SCSI
F,A,SCSI
SCSI,A,C
SCSI,C,A
C only

This parameter allows you to specify the system boot up search sequence. The hard disk ID are listed below:

C: Primary master

D: Primary slave

E: Secondary master

F: Secondary slave

BIOS Features → Swap Floppy Drive

Swap Floppy Drive
Enabled
Disabled

This item allows you to swap floppy drives. For example, if you have two floppy drives (A and B), you can assign the first drive as drive B and the second drive as drive A or vice-versa.

BIOS Features → Boot-up Floppy Seek

Boot-up Floppy Seek
Enabled
Disabled

When enabled, the BIOS issues the seek command to the floppy drive during POST to move floppy drive head forward and backward.

BIOS Features → Boot-up NumLock Status

Boot-up NumLock Status
On
Off

Setting this parameter to On enables the numeric function of the numeric keypad. Set this parameter to Off to disregard the function. Disabling the numeric function allows you to use the numeric keypad for cursor control.

BIOS Features → Boot-up System Speed

Boot-up System Speed
High
Low

Select High or Low system speed after boot.

BIOS Features → Typematic Rate Setting

Typematic Rate Setting
Enabled
Disabled

Set this parameter to Enable/Disable the keyboard repeat function. When enabled, continually holding down a key on the keyboard will generate repeatedly keystrokes.

BIOS Features → Typematic Rate

Typematic Rate
6
8
10
12
15
20
24
30

This item allows you to control the speed of repeated keystrokes. The default is `30 characters/sec` .

BIOS Features→ Typematic Delay

Typematic Delay
250
500
750
1000

This parameter allows you to control the delay time between the first and the second keystroke (where the repeated keystrokes begin). The typematic delay settings are 250, 500, 750, and 1000 msec.

BIOS Features→ Security Option

Security Option
Setup
System

The **System** option limits access to both the System boot and BIOS setup. A prompt asking you to enter your password appears on the screen every time you boot the system.

The **Setup** option limits access only to BIOS setup.

To disable the security option, select Password Setting from the main menu, don't type anything and just press <Enter>.

BIOS Features→ PCI/VGA Palette Snoop

PCI/VGA Palette Snoop
Enabled
Disabled

Enabling this item informs the PCI VGA card to keep silent (and to prevent conflict) when palette register is updated (i.e., accepts data without responding any communication signals). This is useful only when two display cards use the same palette address and plugged in the PCI bus at the same time (such as MPEQ or Video capture). In such case, PCI VGA is silent while MPEQ/Video capture is set to function normally.

BIOS Features→ OS Select for DRAM > 64MB

OS Select for DRAM > 64MB
OS/2
Non-OS/2

Set to OS/2 if your system is utilizing an OS/2 operating system and has a memory size of more than 64 MB.

BIOS Features→ Video BIOS Shadow

Video BIOS Shadow
Enabled
Disabled

VGA BIOS Shadowing means to copy video display card BIOS into the DRAM area. This enhances system performance because DRAM access time is faster than ROM.

BIOS Features → C800-CBFF Shadow
BIOS Features → CC00-CFFF Shadow
BIOS Features → D000-D3FF Shadow
BIOS Features → D400-D7FF Shadow
BIOS Features → D800-DBFF Shadow
BIOS Features → DC00-DFFF Shadow

C8000-CBFFF Shadow
Enabled
Disabled

These six items are for shadowing ROM code on other expansion cards. Before you set these parameters, you need to know the specific addresses of that ROM code. If you do not know this information, enable all the ROM shadow settings.

Note: *The F000 and E000 segments are always shadowed because BIOS code occupies these areas.*

3.4 Chipset Features Setup

The "Chipset Features Setup" includes settings for the chipset dependent features. These features are related to system performance.

```
ROM PCI/ISA BIOS (XXXXXXXX)
CHIPSET FEATURES SETUP
AWARD SOFTWARE, INC.
```

Auto Configuration	: Enabled	
DRAM Timing	: 60 ns	
DRAM Leadoff Timing	: 10/6/3/3	
DRAM Read Burst (EDO/FP)	: x222/x333	
DRAM Write Burst Timing	: x222	
Fast EDO Lead Off	: Disabled	
Refresh RAS# Assertion	: 5 Clks	
DRAM Page Idle Timer	: 2 Clks	
DRAM Enhanced Paging	: Enabled	
Fast MA to RAS# Delay	: 2 Clks	
SDRAM(CAS Lat/RAS-to-CAS)	: 3/3	
SDRAM Speculative Read	: Disabled	
System BIOS Cacheable	: Enabled	
Video BIOS Cacheable	: Enabled	
8 Bit I/O Recovery Time	: 4	ESC: Quit ↑↓→← : Select Item
16 Bit I/O Recovery Time	: 1	F1 : Help PU/PD/+/- : Modify
Memory Hole At 15M-16M	: Disabled	F5 : Old Values (Shift) F2 : Color
PCI Passive Release	: Disabled	F6 : Load Setup Defaults
PCI Delayed Transaction	: Disabled	F7 : Load Turbo Defaults
Mem. Drive Str.(MA/RAS)	: 16mA/16mA	

Caution: *Make sure you fully understand the items contained in this menu before you try to change anything. You may change the parameter settings to improve system performance . However, it may cause system unstable if the setting are not correct for your system configuration.*

Chipset Features→ Auto Configuration

Auto Configuration
Enabled
Disabled

When **Enabled**, the DRAM and cache related timing are set to pre-defined value according to CPU type and clock. Select **Disable** if you want to specify your own DRAM timing.

Chipset Features→ DRAM Timing

DRAM Timing
60 ns
70 ns

There to sets of DRAM timing parameters can be automatically set by BIOS, 60ns and 70ns.

***Warning**: The default memory timing setting is 60ns to get the optimal performance. Because the specification limitation of INTEL TX chipset , 70ns SIMM can only be used with CPU external clock 60MHz. To use 70ns SIMM with 66MHz CPU external clock may result in unstable system behavior.*

Chipset Features→ DRAM Leadoff Timing

DRAM Leadoff Timing
11/7/3/4
10/6/3/3
11/7/4/4
10/6/4/3

The Leadoff means the timing of first memory cycle in the burst read or write. Actually, this item controls only page miss read/write leadoff timing and the clocks of RAS precharge and RAS to CAS delay. The four digital represent Read Leadoff/ Write Leadoff/ RAS Precharge/ RAS to CAS delay. For example, default is **10/6/3/3**, which means you have 10-x-x-x DRAM page miss read and 6-x-x-x DRAM write, with 3 clocks RAS precharge and 3 clocks RAS to CAS delay.

Chipset Features→ DRAM Read Burst (EDO/FP)

DRAM Read Burst (EDO/FP)
x444/x444
x333/x444
x222/x333

Read Burst means to read four continuous memory cycles on four predefined addresses from the DRAM. The default value is **x222/x333** for 60ns EDO or FPM (Fast Page Mode) DRAM. Which means the 2nd,3rd and 4th memory cycles are 2 CPU clocks for EDO and 3 clocks for FPM. The value of x is the timing of first memory cycle and depends on the "DRAM Leadoff Timing" setting.

Chipset Features→ DRAM Write Burst Timing

DRAM Write Burst Timing
x444
x333
x222

Write Burst means to write four continuous memory cycles on four predefined addresses to the DRAM. This item sets the DRAM write timing of the 2nd,3rd and 4th memory cycles. There is no difference of EDO and FPM DRAM on the write burst timing. The value of x depends on the "DRAM Leadoff Timing" setting.

Chipset Features→ Fast EDO Lead Off

Fast EDO Lead Off
Enabled
Disabled

This item enables fast EDO read timing, results 1 clock pull-in for read leadoff latency of EDO read cycles. It must be Disabled, if any FPM DRAM is installed.

Chipset Features→ Refresh RAS# Assertion

Refresh RAS# Assertion
5 Clks
4 Clks

This item controls the number of clocks RAS is asserted for refresh cycle.

Chipset Features→ DRAM Page Idle Timer

DRAM Page Idle Timer
2 Clks
4 Clks
6 Clks
8 Clks

This item determines the amount of time in CPU clocks that DRAM page will be close after CPU becomes idle.

Chipset Features→ DRAM Enhance Paging

DRAM Enhance Paging
Enabled
Disabled

When Enabled, TX chipset will keep DRAM page open as long as possible according to enhanced method.

Chipset Features→ SDRAM(CASLat/RAS-to-CAS)

SDRAM(CAS Lat/RAS-to-CAS)
2/2
3/3

These are timing of SDRAM CAS Latency and RAS to CAS Delay, calculated by clocks. They are important parameters affects SDRAM performance, default is 2 clocks. If your SDRAM has unstable problem, change 2/2 to 3/3.

Chipset Features→ SDRAM Speculative Read

SDRAM Speculative Read
Enabled
Disabled

Enable this item reduce one clock of SDRAM read leadoff timing by presenting the SDRAM read request before the controller chip decodes the final memory target. This Item must be **Disabled** if more than one DIMM is installed in the system.

Chipset Features→ System BIOS Cacheable

System BIOS Cacheable
Enabled
Disabled

Enabling this item allows you to cache the system BIOS to further enhance system performance.

Chipset Features→ Video BIOS Cacheable

Video BIOS Cacheable
Enabled
Disabled

Allows the video BIOS to be cached to allow faster video performance.

Chipset Features→ 8 Bit I/O Recovery Time

8 Bit I/O Recovery Time
1
2
3
4
5
6
7
8
NA

For some old I/O chips, after the execution of an I/O command, the device requires a certain amount of time (recovery time) before the execution of the next I/O command. Because of new generation CPU and mainboard chipset, the assertion of I/O command is faster, and sometimes shorter than specified I/O recovery time of old I/O devices. This item lets you specify the delay of 8-bit I/O command by count of ISA bus clock. If you find any unstable 8-bit I/O card, you may try to extend the I/O recovery time via this item. The BIOS default value is **4 ISA clock.** If set to NA, the chipset will insert 3.5 system clocks.

Chipset Features→ 16 Bit I/O Recovery Time

16 Bit I/O Recovery Time
1
2
3
4
NA

The same as 16-bit I/O recovery time. This item lets you specify the recovery time for the execution of 16-bit I/O commands by count of ISA bus clock. If you find any of the installed 16-bit I/O cards unstable, try extending the I/O recovery time via this item. The BIOS default value is **1 ISA clocks**. If set to NA, the chipset will automatically insert 3.5 system clocks.

Chipset Features→ Memory Hole At 15M-16M

Memory Hole At 15M-16M
Enabled
Disabled

This option lets you reserve system memory area for special ISA cards. The chipset accesses code/data of these areas from the ISA bus directly. Normally, these areas are reserved for memory mapped I/O card.

Chipset Features→ PCI Passive Release

PCI Passive Release
Enabled
Disabled

This item lets you control the Passive Release function of the PIIX4 chipset (Intel PCI to ISA bridge). This function is used to meet latency of ISA bus master. Try to enable or disable it, if you have ISA card compatibility problem.

Chipset Features→ PCI Delayed Transaction

PCI Delayed Transaction
Enabled
Disabled

This item lets you control the Delayed Transaction function of the PIIX4 chipset (Intel PCI to ISA bridge). This function is used to meet latency of PCI cycles to or from ISA bus. Try to enable or disable it, if you have ISA card compatibility problem.

Chipset Features→ Mem. Drive Str. (MA/RAS)

Mem. Drive Str. (MA/RAS)
10mA/10mA
10mA/16mA
16mA/10mA
16mA/16mA

This option controls the driving strength of memory address and control signals. It is recommended to use less driving current for light memory loading, to prevent undershoot or overshoot.

3.5 Power Management Setup

The Power Management Setup screen enables you to control themainboard ' s green features. See the following screen.

```
ROM PCI/ISA BIOS (XXXXXXXX)
POWER MANAGEMENT SETUP
AWARD SOFTWARE, INC.
```

Power Management	: Disabled	** Reload Global Timer Events **	
PM Control by APM	: Yes	IRQ [3-7,9-15],NMI	: Enabled
Video Off Method	: V/H SYNC + Blank	Primary IDE 0	: Disabled
Video Off After	: Suspend	Primary IDE 1	: Disabled
		Secondary IDE 0	: Disabled
Doze Mode	: Disabled	Secondary IDE 1	: Disabled
Standby Mode	: Disabled	Floppy Disk	: Disabled
Suspend Mode	: Disabled	Serial Port	: Disabled
HDD Power Down	: Disabled	Parallel Port	: Disabled
Suspend Mode Option	: Power On Suspend		
Throttle Duty Cycle	: 62.5%		
VGA Active Monitor	: Disabled		
		ESC: Quit	↑↓→← : Select Item
** Break event From Suspend **		F1 : Help	PU/PD/+/- : Modify
IRQ 8 Clock Event	: Disabled	F5 : Old Values	(Shift) F2 : Color
		F6 : Load Setup Defaults	
		F7 : Load Turbo Defaults	

Power Management→ Power Management

Power Management
Max Saving
Mix Saving
User Defined
Disabled

This function allows you to set the default parameters of power-saving modes. Set to **Disable** to turn off power management function. Set to User Defined to choose your own parameters.

Mode	Doze	Standby	Suspend	HDD Power Down
Min Saving	1 hour	1 hour	1 hour	15 min
Max Saving	1 min	1 min	1 min	1 min

Power Management→ PM Controlled by APM

PM Controlled by APM
Yes
No

If "Max Saving" is selected, you can turn on this item, transfer power management control to APM (Advanced Power Management) and enhance power saving function. For example, stop CPU internal clock.

Power Management→ Video Off Method

Video Off Method
Blank Screen
V/H SYNC+Blank
DPMS

This determines the way that monitor is off. Blank Screen writes blanks to video buffer. V/HSYNC+Blank allows BIOS to control VSYNC and HSYNC signals. This function applies only for DPMS (Display Power Management Standard) monitor. The DPMS mode uses DPMS function provided by VGA card.

Power Management→ Video Off After

Video Off After
N/A
Doze
Standby
Suspend

To turn off video monitor at which power down mode.

Power Management→ Doze Mode

Doze Mode
Disabled
1 Min
2 Min
4 Min
8 Min
12 Min
20 Min
30 Min
40 Min
1 Hour

This item lets you set the period of time after which the system enters into Doze mode. In this mode, the CPU clock slows down. The ratio is specified in the "Throttle Duty Cycle". Any activity detected returns the system to full power. The system activity (or event) is detected by monitoring the IRQ signals.

Power Management→ Standby Mode

Standby Mode
Disabled
1 Min
2 Min
4 Min
8 Min
12 Min
20 Min
30 Min
40 Min
1 Hour

This item lets you set the period of time after which the system enters into Standby mode. In this mode, CPU clock slows down, hard disk will be shut off and the monitor power-saving feature activates. Any activity detected returns the system to full power. The system activity (or event) is detected by monitoring the IRQ signals.

Power Management→ Suspend Mode

Suspend Mode
Disabled
1 Min
2 Min
4 Min
8 Min
12 Min
20 Min
30 Min
40 Min
1 Hour

This item lets you set the period of time after which the system enters into Suspend mode. The Suspend mode can be Power On Suspend or Suspend to Hard Drive, selected by "Suspend Mode Option".

Power Management→ HDD Power Down

HDD Power Down
Disabled
1 Min
.....
15 Min

This option lets you specify the IDE HDD idle time before the device enters the power down state. This item is independent from the power states previously described in this section (Standby and Suspend).

Power Management→ Suspend Mode Option

Suspend Mode Option
Power On Suspend
Suspend to Hard Drive

You can select suspend mode by this item. **Power On Suspend** is the traditional Green PC suspend mode, the CPU clock is stop, all other devices are shut off. But power must be kept On to detect activities from modem, keyboard/mouse and returns the system to full power. The system activities is detected by monitoring the IRQ signals. **Suspend to Hard Drive** saves system status, memory and screen image into hard disk, then the power can be totally Off. Next time, when power is turned On, the system goes back to your original work within just few seconds. You need utility ZVHDD to reserve disk space. Refer to section 3.16 "Suspend to Hard Drive" for more information".

Power Management→ Throttle Duty Cycle

Throttle Duty Cycle
12.5 %
25.0 %
37.5 %
50.0 %
62.5 %
75.0 %
87.5 %

Clock Throttling means at the Doze/Standby state, the CPU clock count in a given time (not the frequency) is reduced to the ratio specified in this parameter. Actually, the period per CPU clock is not changed. For example, a 66MHz CPU clock remains the same 30ns clock period when system goes into Doze/Suspend. The chipset generates the STPCLK (stop clock) signal periodically to prevent CPU for accepting clock from clock generator. For full power on, the CPU can receive 66M count in one second. If the Slow Clock Ratio is set to 50%, the CPU will only receive 33M clock count in one second. This will effectively reduce CPU speed as well as CPU power.

Power Management→ VGA Active Monitor

VGA Activity Monitor
Enabled
Disabled

To enable or disable the detection of VGA activity for power down state transition.

Power Management→ IRQ 8 Clock Event

IRQ 8 Clock Event
Enabled
Disabled

To enable or disable the detection of IRQ8 (RTC) event for power down state transition. OS2 has periodically IRQ8 (RTC) interruptions, If IRQ8 is not set to **Disabled**, OS/2 may fail to go into Doze/Standby/Suspend mode.

Power Management→ IRQ [3-7,9-15],NMI

IRQ [3-7,9-15],NMI
Enabled
Disabled

To enable or disable the detection of IRQ3-7, IRQ9-15 or NMI interrupt events for power down state transition.

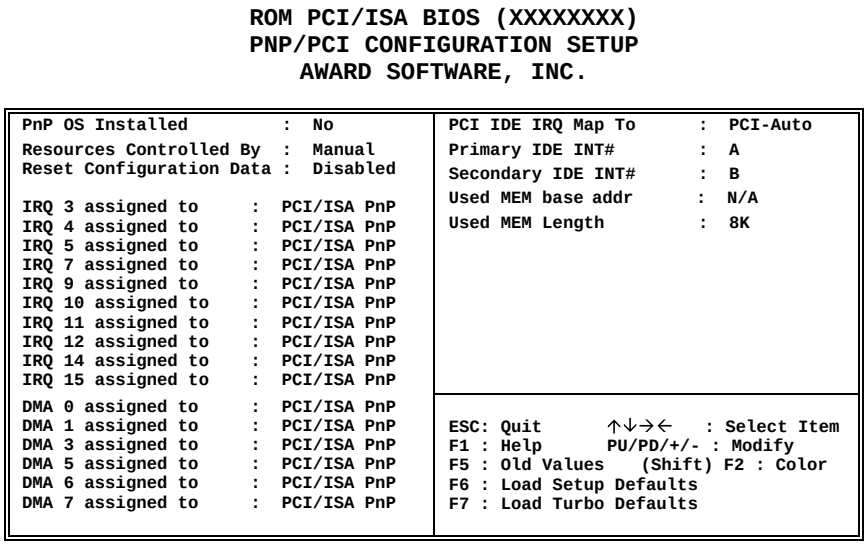
Power Management→ Primary IDE 0
Power Management→ Primary IDE 1
Power Management→ Secondary IDE 0
Power Management→ Secondary IDE 1
Power Management→ Floppy Disk
Power Management→ Serial Port
Power Management→ Parallel Port

Primary IDE 0
Enabled
Disabled

These items enable or disable the detection of IDE, floppy, serial and parallel port activities for power down state transition. Actually it detects the read/write to/from I/O or address port.

3.6 PNP/PCI Configuration Setup

The PNP/PCI Configuration Setup allows you to configure the ISA and PCI devices installed in your system. The following screen appears if you select the option "PNP/PCI Configuration Setup" from the main menu.


ROM PCI/ISA BIOS (XXXXXXXX)
PNP/PCI CONFIGURATION SETUP
AWARD SOFTWARE, INC.
PnP OS Installed : No
Resources Controlled By : Manual
Reset Configuration Data : Disabled
IRQ 3 assigned to : PCI/ISA PnP
IRQ 4 assigned to : PCI/ISA PnP
IRQ 5 assigned to : PCI/ISA PnP
IRQ 7 assigned to : PCI/ISA PnP
IRQ 9 assigned to : PCI/ISA PnP
IRQ 10 assigned to : PCI/ISA PnP
IRQ 11 assigned to : PCI/ISA PnP
IRQ 12 assigned to : PCI/ISA PnP
IRQ 14 assigned to : PCI/ISA PnP
IRQ 15 assigned to : PCI/ISA PnP
DMA 0 assigned to : PCI/ISA PnP
DMA 1 assigned to : PCI/ISA PnP
DMA 3 assigned to : PCI/ISA PnP
DMA 5 assigned to : PCI/ISA PnP
DMA 6 assigned to : PCI/ISA PnP
DMA 7 assigned to : PCI/ISA PnP
PCI IDE IRQ Map To : PCI-Auto
Primary IDE INT# : A
Secondary IDE INT# : B
Used MEM base addr : N/A
Used MEM Length : 8K
ESC: Quit ↑↓→← : Select Item
F1 : Help PU/PD/+/- : Modify
F5 : Old Values (Shift) F2 : Color
F6 : Load Setup Defaults
F7 : Load Turbo Defaults

PNP/PCI Configuration→ PnP OS Installed

PnP OS Installed
Yes
No

Normally, the PnP resources are allocated by BIOS during POST (Power-On Self Test). If you are using a PnP operating system (such as Windows 95), set this item to Yes to inform BIOS to configure only the resources needed for booting (VGA/IDE or SCSI). The rest of system resources will be allocated by PnP operating system.

PNP/PCI Configuration→ Resources Controlled By

Resources Controlled by
Auto
Manual

Setting this option to Manual allows you to individually assign the IRQs and DMAs to the ISA and PCI devices. Set this to **Auto** to enable the auto-configuration function.

PNP/PCI Configuration→ Reset Configuration Data

Reset Configuration Data
Enabled
Disabled

In case conflict occurs after you assign the IRQs or after you configure your system, you can enable this function, allow your system to automatically reset your configuration and reassign the IRQs.

PNP/PCI Configuration→ IRQ3 (COM2)
PNP/PCI Configuration→ IRQ4 (COM1)
PNP/PCI Configuration→ IRQ5 (Network/Sound or Others)
PNP/PCI Configuration→ IRQ7 (Printer or Others)
PNP/PCI Configuration→ IRQ9 (Video or Others)
PNP/PCI Configuration→ IRQ10 (SCSI or Others)
PNP/PCI Configuration→ IRQ11 (SCSI or Others)
PNP/PCI Configuration→ IRQ12 (PS/2 Mouse)
PNP/PCI Configuration→ IRQ14 (IDE1)
PNP/PCI Configuration→ IRQ15 (IDE2)

IRQ 3
Legacy ISA
PCI/ISA PnP

If your ISA card is not PnP compatible and requires a special IRQ to support its function, set the selected IRQ to **Legacy ISA**. This setting informs the PnP BIOS to reserve the selected IRQ for the installed legacy ISA card. The default is **PCI/ISA PnP**. Take note that PCI cards are always PnP compatible (except old PCI IDE card).

PNP/PCI Configuration→ DMA 0
PNP/PCI Configuration→ DMA 1
PNP/PCI Configuration→ DMA 3
PNP/PCI Configuration→ DMA 5
PNP/PCI Configuration→ DMA 6
PNP/PCI Configuration→ DMA 7

DMA 0
Legacy ISA
PCI/ISA PnP

If your ISA card is not PnP compatible and requires a special DMA channel to support its function, set the selected DMA channel to **Legacy ISA**. This setting informs the PnP BIOS to reserve the selected DMA channel for the installed legacy ISA card. The default is **PCI/ISA PnP**. Take note that PCI card does not require DMA channel.

PNP/PCI Configuration→ PCI IDE IRQ Map To

PCI IDE IRQ Map To
ISA
PCI-Slot1
PCI-Slot2
PCI-Slot3
PCI-Slot4
PCI-Auto

Some old PCI IDE add-on cards are not fully PnP compatible. These cards require you to specify the slot in use to enable BIOS to properly configure the PnP resources. This function allows you to select the PCI slot for any PCI IDE add-on card present in your system. Set this item to **Auto** to allow BIOS to automatically configure the installed PCI IDE card(s).

PNP/PCI Configuration→ Primary IDE INT#
PNP/PCI Configuration→ Secondary IDE INT#

Primary IDE INT#
A
B
C
D

These two items, in conjunction with item "PCI IDE IRQ Map To", specify the IRQ routing of the primary or secondary channel of the PCI IDE add-on card (not the onboard IDE). Each PCI slot has four PCI interrupts aligned as listed in the table below. You must specify the slot in the "PCI IDE IRQ Map To", and set the PCI interrupt (INTx) here according to the interrupt connection on the card.

PCI Slot	Location 1	Location 2	Location 3	Location 4

	(pin A6)	(pin B7)	(pin A7)	(pin B8)
Slot 1	INTA	INTB	INTC	INTD
Slot 2	INTB	INTC	INTD	INTA
Slot 3	INTC	INTD	INTA	INTB
Slot 4	INTD	INTA	INTB	INTC
Slot 5 (if any)	INTD	INTA	INTB	INTC

PNP/PCI Configuration→ Used MEM Base Addr

Used MEM base addr
N/A
C800
CC00
D000
D400
D800
DC00

This item, in conjunction with the "Used MEM Length", lets you set a memory space for non-PnP compatible ISA card. This item specifies the memory base (start address) of the reserved memory space. The memory size is specified in the "Used MEM Length".

PNP/PCI Configuration→ Used MEM Length

Used MEM Length
8K
16K
32K
64K

If your ISA card is not PnP compatible and requires special memory space to support its function, specify the memory size in this parameter to inform the PnP BIOS to reserve the specified memory space for installed legacy ISA card.

3.7 Load Setup Defaults

The "Load Setup Defaults" option loads optimized settings for optimum system performance. Optimal settings are relatively safer than the Turbo settings. We recommend you to use the Optimal settings if your system has large memory size and fully loaded with add-on card (for example, a file server using double-sided 8MB SIMM x4 and SCSI plus Network card occupying the PCI and ISA slots).

Optimal is not the slowest setting for this mainboard. If you need to verify a unstable problem, you may manually set the parameter in the "BIOS Features Setup" and "Chipset Features Setup" to get slowest and safer setting.

3.8 Load Turbo Defaults

The "Load Turbo Defaults" option gives better performance than Optimal values. However, Turbo values may not be the best setting of this mainboard but these values are qualified by the AOpen RD and QA department as the reliable settings especially if you have limited loading of add-on card and memory size (for example, a system that contains only a VGA/Sound card and two SIMMs).

To attain the best system performance, you may manually set the parameters in the "Chipset Features Setup" to get proprietary setting. Make sure that you know and understand the functions of every item in Chipset Setup menu. The performance difference of Turbo from Optimal is normally around 3% to 10%, depending on the chipset and the application.

3.9 Integrated Peripherals

The following screen appears if you select the option "Integrated Peripherals" from the main menu. This option allows you to configure the I/O features.

```
ROM PCI/ISA BIOS (XXXXXXXX)
INTEGRATED PERIPHERALS
AWARD SOFTWARE, INC.
```

IDE HDD Block Mode:	Enabled	Parallel Port Mode	Normal
IDE Primary Master PIO	Auto	ECP Mode Use DMA	3
IDE Primary Slave PIO	Auto		
IDE Secondary Master PIO	Auto		
IDE Secondary Slave PIO	Auto		
IDE Primary Master UDMA	Auto		
IDE Primary Slave UDMA	Auto		
IDE Secondary Master UDMA	Auto		
IDE Secondary Slave UDMA	Auto		
On-Chip Primary PCI-IDE	Enabled		
On-Chip Secondary PCI-IDE	Enabled		
USB Legacy Support	Disabled		
USB IRQ Released	No		
Onboard FDC Controller	Enabled		
Onboard UART 1	AUTO	ESC: Quit	↑↓→← : Select Item
Onboard UART 2	AUTO	F1 : Help	PU/PD/+/- : Modify
Onboard UART 2 Mode	Standard	F5 : Old Values	(Shift) F2 : Color
IR Duplex Mode	Half	F6 : Load Setup Defaults	
Onboard Parallel Port	378/IRQ7	F7 : Load Turbo Defaults	

Integrated Peripherals→ IDE HDD Block Mode

IDE HDD Block Mode
Enabled
Disabled

This feature enhances disk performance by allowing multisector data transfers and eliminates the interrupt handling time for each sector. Most IDE drives, except with old designs, can support this feature.

Integrated Peripherals→ IDE Primary Master PIO
Integrated Peripherals→ IDE Primary Slave PIO
Integrated Peripherals→ IDE Secondary Master PIO
Integrated Peripherals→ IDE Secondary Slave PIO

IDE Primary Master PIO
Auto
Mode 1
Mode 2
Mode 3
Mode 4

Setting this item to **Auto** activates the HDD speed auto-detect function. The PIO mode specifies the data transfer rate of HDD. For example: mode 0 data transfer rate is 3.3MB/s, mode 1 is 5.2MB/s, mode 2 is 8.3MB/s, mode 3 is 11.1MB/s and mode 4 is 16.6MB/s. If your hard disk performance becomes unstable, you may manually try the slower mode.

Caution: *It is recommended that you connect the first IDE device of each channel to the endmost connector of the IDE cable. Refer to section 2.3 "Connectors" for details on how to connect IDE device(s).*

Integrated Peripherals→ IDE Primary Master UDMA
Integrated Peripherals→ IDE Primary Slave UDMA
Integrated Peripherals→ IDE Secondary Master UDMA
Integrated Peripherals→ IDE Secondary Slave UDMA

IDE Primary Master UDMA
Auto
Disabled

This item allows you to set the Ultra DMA/33 mode supported by the hard disk drive connected to your primary IDE connector.

Integrated Peripherals→ On-Chip Primary PCI IDE
Integrated Peripherals→ On-Chip Secondary PCI IDE

On-Chip Primary PCI IDE
Enabled
Disabled

This parameter lets you enable or disable the IDE device connected to the primary IDE connector.

Integrated Peripherals→ USB Legacy Support

USB Legacy Support
Enabled
Disabled

This item lets you enable or disable the USB keyboard driver within the onboard BIOS. The keyboard driver simulates legacy keyboard command and let you use USB keyboard during POST or after boot if you don't have USB driver in the operating system.

***Caution**: You can not use both USB driver and USB legacy keyboard at the same time. Disable "USB Legacy Support" if you have USB driver in the operating system.*

USB IRQ Released
Yes
No

USB device is default to use PCI INTD#, the same as PCI slot4. If you installed PCI card on slot4 and require to use INTD#, set this item to Yes. The USB device will then be disabled.

***Note:** Normally, PCI VGA does not need PCI interrupt, you may put PCI VGA on slot4.*

Integrated Peripherals→ Onboard FDC Controller

Onboard FDC Controller
Enabled
Disabled

Setting this parameter to **Enabled** allows you to connect your floppy disk drives to the onboard floppy disk connector instead of a separate controller card. Change the setting to Disabled if you want to use a separate controller card.

Integrated Peripherals→ Onboard UART 1
Integrated Peripherals→ Onboard UART 2

Onboard UART 1
Auto
3F8/IRQ4
2F8/IRQ3
3E8/IRQ4
2E8/IRQ3
Disabled

This item allow you to assign address and interrupt for the board serial port. Default is **Auto**.

Note: *If you are using an network card, make sure that the interrupt does not conflict.*

Integrated Peripherals→ Onboard UART 2 Mode

Onboard UART 2 Mode
Standard
HPSIR
ASKIR

This item is configurable only if the "Onboard UART 2" is enabled. This allows you to specify the mode of serial port2. The available mode selections are:

- Standard - Sets serial port 2 to operate in normal mode. This is the default setting.
- HPSIR - Select this setting if you installed an Infrared module in your system via IrDA connector (refer to section 2.3 "Connectors"). This setting allows infrared serial communication at a maximum baud rate of 115K baud.
- ASKIR - Select this setting if you installed an Infrared module via IrDA connector (refer to section 2.32.3 "Connectors"). This setting allows infrared serial communication at a maximum baud rate of 19.2K baud.

Integrated Peripherals→ IR Duplex Mode

IR Duplex Mode
Full
Half

This item lets you set the duplex mode for the IR communication. Full - Allows IR communication in bi-directional mode. Half - Allows IR communication in single direction only.

Note: *This option appears only if the IR function is activated and the Onboard UART 2 Mode parameter is NOT set to* Standard*.*

Integrated Peripherals→ Onboard Parallel Port

Onboard Parallel Port
3BC/IRQ7
378/IRQ7
278/IRQ7
Disabled

This item controls the onboard parallel port address and interrupt.

Note: *If you are using an I/O card with a parallel port, make sure that the addresses and IRQ do not conflict.*

Integrated Peripherals→ Parallel Port Mode

Parallel Port Mode
Normal
EPP
ECP
ECP + EPP

This item lets you set the parallel port mode. The mode options are **Normal** (Standard and Bidirection Parallel Port), EPP (Enhanced Parallel Port) and ECP (Extended Parallel Port). Normal is the IBM AT and PS/2 compatible mode. EPP enhances the parallel port throughput by directly writing/reading data to/from parallel port without latch. ECP supports DMA and RLE (Run Length Encoded) compression and decompression.

Integrated Peripherals→ ECP Mode Use DMA

ECP Mode Use DMA
3
1

This item lets you set the DMA channel of ECP mode.

3.10 Password Setting

Password prevents unauthorized use of your computer. If you set a password, the system prompts for the correct password before boot or access to Setup.

To set a password:

1. At the prompt, type your password. Your password can be up to 8 alphanumeric characters. When you type the characters, they appear as asterisks on the password screen box.
2. After typing the password, press.
3. At the next prompt, re-type your password and press again to confirm the new password. After the password entry, the screen automatically reverts to the main screen.

To disable the password, press when prompted to enter the password. The screen displays a message confirming that the password has been disabled.

3.11 IDE HDD Auto Detection

If your system has an IDE hard drive, you can use this function to detect its parameters and enter them into the "Standard CMOS Setup" automatically.

This routine only detects one set of parameters for your IDE hard drive. Some IDE drives can use more than one set of parameters. If your hard disk is formatted using different parameters than those detected, you have to enter the parameters manually. If the parameters listed do not match the ones used to format the disk, the information on that disk will not be accessible. If the auto-detected parameters displayed do not match those that used for your drive, ignore them. Type N to reject the values and enter the correct ones manually from the Standard CMOS Setup screen.

3.12 Save & Exit Setup

This function automatically saves all CMOS values before leaving Setup.

3.13 Exit without Saving

Use this function to exit Setup without saving the CMOS value changes. Do not use this option if you want to save the new configuration.

3.14 NCR SCSI BIOS and Drivers

The NCR 53C810 SCSI BIOS resides in the same flash memory chip as the system BIOS. The onboard NCR SCSI BIOS is used to support NCR 53C810 SCSI control card without BIOS code.

The NCR SCSI BIOS directly supports DOS, Windows 3.1 and OS/2. For better system performance, you may use the drivers that come with the NCR SCSI card or with your operating system. For details, refer to the installation manual of your NCR 53C810 SCSI card.

3.15 BIOS Flash Utility

The BIOS Flash utility allows you to upgrade the system BIOS. To get the AOpen Flash utility and the upgrade BIOS file, contact your local distributor or visit our homepage at **http://www.aopen.com.tw** . Please make sure that you have the correct BIOS ready, the BIOS filename is normally like AP5TR110.BIN, which means model AP5T BIOS revision 1.10.

There are two useful programs, Checksum utility CHECKSUM.EXE and AOpen Flash utility AOFLASH.EXE. Follow the procedures below to upgrade your BIOS.

AWARD BIOS

[CHECKSUM.EXE]

This utility will help you to determine if the BIOS has been downloaded correctly or not.

1. Execute
   C:> CHECKSUM Biosfile.bin
   Biosfile.bin is the filename of the BIOS code.
2. The utility will show "Checksum is ssss".
3. Compare the "ssss" with original checksum posted on Web or BBS. If they are different, please do not proceed any further and try to download the BIOS again.

[AOFLASH.EXE]

This utility will try to check the mainboard model, BIOS version and Super/Ultra IO chip model. To ensure the correct BIOS file for the correct mainboard and IO chip. This utility will permanently replace your original BIOS content after flashing.

1. Bootup the system from DOS prompt without loading any memory manager (HIMEM, EMM386, QEMM386, ...).
2. Execute
   C:> AOFLASH Biosfile.bin
   Biosfile.bin is the filename of the BIOS code.
3. After loading the new BIOS code, the utility will prompt you to save original BIOS code into your HDD or floppy. Please press "Y" to store it as "BIOS.OLD".
4. After the old BIOS has been successfully saved, press "Y" to replace BIOS.
5. DO NOT turn off the power during "FLASHING".
6. Reboot the system by turn off the power after "FLASHING".
7. Press "DEL" key to enter BIOS setup during POST.
8. Reload the "BIOS SETUP DEFAULT" and reconfigure other items as previous set.
9. Save & Exit. Done!

Warning: *DO NOT turn off the power during "FLASHING". If the BIOS programming is not successfully finished, the system will not be boot again, and you may need to physically replace the BIOS chip.*

Tip: *You may load back original BIOS "BIOS.OLD" by the same procedure.*

3.16 Suspend to Hard Drive

Suspend to Hard Drive saves your current work (system status, memory and screen image) into hard disk, and then the system can be totally power off. Next time, when power is on, you can resume your original work directly from hard disk within few second without go through the Win95 booting process and run your application again. If your memory is 16MB, normally, you need to reserve at least 16MB HDD space to save your memory image. Note that you have to use VESA compatible PCI VGA (AOpen PV60/PT60), SoundBlaster compatible sound card (AOpen AW32 or MP32) for Suspend to Hard Drive to work properly. Of course, we recommend to use AOpen products for best compatibility.

To use Suspend to Hard Drive:

1. Go into BIOS setup, Power Management → Suspend Mode Option, select "Suspend to Drive".
2. Bootup your system into DOS command prompt. If you are Win'95 user, Please restart you Windows 95 under "Command Prompt" by pressing "F8" while system shows "Windows 95 Starting ...". Choose "Command Prompt Mode" from selection so that system will start in DOS command prompt.
3. Use utility "ZVHDD" to create a hidden file in your hard disk drive. This file is used to save your system status and memory image. Just type:

   C:>ZVHDD /c /file

   Please make sure that you have enough continuous HDD space for creating this hidden file. For example, if you have 16MB of system memory, you need at least 16MB (+ VGA memory size) of continuous HDD space. If ZVHDD failed to allocate the HDD space, you may run "DEFRAG" Utility or "Disk Defragmenter" which come with MS-DOS or Win'95 to free HDD space.
4. After creating above hidden file, please reboot your system.

5. Push suspend switch or use Win95 Suspend icon to force system goes into Suspend to Hard Drive mode and then turn system power off by power switch of your power supply.
6. Next time you turn on your system, it will resume to your original work automatically.

Tip: *Following VGA card has been tested & recognized as VESA compatible VGA device.*

AOpen PV90 (Trident 9680)
AOpen PT60 (S3 Virge/BIOS R1.00-01)
AOpen PV60 (S3 Tiro64V+)
ProLink Trident GD-5440
ProLink Cirrus GD-5430
ProLink Cirrus GD-5446
ATI Mach 64 GX
ATI 3D RAGE II
Diamond Stealth64D (S3 868)
Diamond Stealth64V (S3 968)
KuoWei ET-6000.

Appendix A

Jumper Table Summary

Setting the CPU Voltage

JP7	CPU Core Voltage (Vcore)
1-2	3.45V (default for P54C)
3-4	3.52V (Cyrix or AMD K5)
5-6	2.9V (AMD K6-166/200)
7-8	2.8V (PP/MT P55C)
9-10	3.2V (AMD K6-233)
11-12	2.5V

JP8	I/O Voltage (Vio)
1-2	3.45V (default)
3-4	3.52V

JP9	JP10	CPU Type (Vcpuio)
1-2 & 3-4	Open	Single Voltage CPU, Vcpuio = Vcore, (default).
Open	1-2 & 3-4	Dual Voltage CPU, Vcpuio = Vio, (PP/MT P55C).

Warning: *The heat dissipation of Intel PP/MT-233Hz, AMD K6-200/233MHz exceed the original design of this mainboard. Please make sure that you have installed CPU fan properly if Intel PP/MT-233 or AMD K6-200/233 is being selected to use. It may cause your system unstable if you can not meet the heat dissipation requirement from above CPU type. It is recommended to adopt larger fan on these CPU for better air flow in the system.*

Jumper Table Summary

CPU Type	Vcore	Vio	Vcpuio	JP7	JP8	JP9	JP10
INTEL P54C	3.45V	3.45V	Vcore	1-2	1-2	1-2 &3-4	Open
INTEL PP/MT	2.8V	3.45V	Vio	7-8	1-2	Open	1-2 & 3-4
AMD K5	3.52V	3.45V	Vcore	3-4	1-2	1-2 & 3-4	Open
AMD K6-166/200	2.9V	3.45V	Vio	5-6	1-2	Open	1-2 & 3-4
AMD K6-233	3.2V	3.45V	Vio	9-10	1-2	Open	1-2 & 3-4
Cyrix 6x86	3.52V	3.45V	Vcore	3-4	1-2	1-2 &3-4	Open
Cyrix 6x86L	2.8V	3.45V	Vio	7-8	1-2	Open	1-2 & 3-4

Selecting the CPU Frequency

JP1	JP2	CPU Frequency Ratio
1-2	1-2	1.5x (3.5x)
2-3	1-2	2x
2-3	2-3	2.5x (1.75x)
1-2	2-3	3x

JP5	JP3	JP4	CPU External Clock
1-2	1-2	2-3	60MHz
1-2	2-3	1-2	66MHz
2-3	1-2	2-3	75MHz
2-3	2-3	1-2	83.3MHz

Note: ***JP5*** *is used to select 75MHz and 83.3MHz, it is implemented from AP5T-2. For AP5T-1, just ignore JP5.*

Note: *Intel PP/MT 233MHz is using 1.5x jumper setting for 3.5x frequency ratio, and AMD PR166 is using 2.5x setting for 1.75x frequency ratio.*

INTEL Pentium	CPU Core Frequency	Ratio	External Bus Clock	JP1 & JP2	JP5 & JP3 & JP4
P54C 90	90MHz =	1.5x	60MHz	1-2 & 1-2	1-2 & 1-2 & 2-3
P54C 100	100MHz =	1.5x	66MHz	1-2 & 1-2	1-2 & 2-3 & 1-2
P54C 120	120MHz =	2x	60MHz	2-3 & 1-2	1-2 & 1-2 & 2-3
P54C 133	133MHz =	2x	66MHz	2-3 & 1-2	1-2 & 2-3 & 1-2
P54C 150	150MHz =	2.5x	60MHz	2-3 & 2-3	1-2 & 1-2 & 2-3
P54C 166	166MHz =	2.5x	66MHz	2-3 & 2-3	1-2 & 2-3 & 1-2
P54C 200	200MHz =	3x	66MHz	1-2 & 2-3	1-2 & 2-3 & 1-2

INTEL Pentium	CPU Core Frequency	Ratio	External Bus Clock	JP1 & JP2	JP5 & JP3 & JP4
PP/MT 150	150MHz =	2.5x	60MHz	2-3 & 2-3	1-2 & 1-2 & 2-3
PP/MT 166	166MHz =	2.5x	66MHz	2-3 & 2-3	1-2 & 2-3 & 1-2
PP/MT 200	200MHz =	3x	66MHz	1-2 & 2-3	1-2 & 2-3 & 1-2
PP/MT 233	233MHz =	3.5x	66MHz	1-2 & 1-2	1-2 & 2-3 & 1-2

Cyrix 6x86 & 6x86L	CPU Core Frequency	Ratio	External Bus Clock	JP1 & JP2	JP5 & JP3 & JP4
P150+	120MHz =	2x	60MHz	2-3 & 1-2	1-2 & 1-2 & 2-3
P166+	133MHz =	2x	66MHz	2-3 & 1-2	1-2 & 2-3 & 1-2

AMD K5	CPU Core Frequency	Ratio	External Bus Clock	JP1 & JP2	JP5 & JP3 & JP4
PR90	90MHz =	1.5x	60MHz	1-2 & 1-2	1-2 & 1-2 & 2-3
PR100	100MHz =	1.5x	66MHz	1-2 & 1-2	1-2 & 2-3 & 1-2
PR120	90MHz =	1.5x	60MHz	1-2 & 1-2	1-2 & 1-2 & 2-3
PR133	100MHz =	1.5x	66MHz	1-2 & 1-2	1-2 & 2-3 & 1-2
PR166	116MHz =	1.75x	66MHz	2-3 & 2-3	1-2 & 2-3 & 1-2

AMD K6	CPU Core Frequency	Ratio	External Bus Clock	JP1 & JP2	JP5 & JP3 & JP4
PR2-166	166MHz =	2.5x	66MHz	2-3 & 2-3	1-2 & 2-3 & 1-2
PR2-200	200MHz =	3x	66MHz	1-2 & 2-3	1-2 & 2-3 & 1-2
PR2-233	233MHz =	3.5x	66MHz	1-2 & 1-2	1-2 & 2-3 & 1-2

Jumper Table Summary

Disabling the Onboard Super I/O

JP18	Onboard Super I/O
1-2	Enable (default)
2-3	Disable

Disabling the PS/2 Mouse

JP20	PS/2 Mouse
1-2	Enable (default)
2-3	Disable

Clear CMOS

JP14	Clear CMOS
1-2	Normal operation (default)
2-3	Clear CMOS

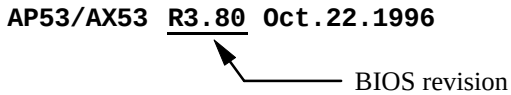
Appendix B

Frequently Asked Question

Note: *FAQ may be updated without notice. If you cannot find the information that you need in this appendix, visit our WWW home page, (address:* ***http://www.aopen.com.tw****) and check the FAQ area and other new information.*

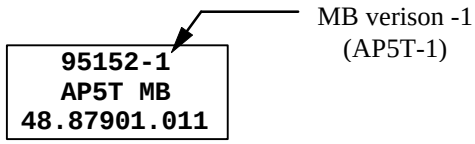
Q: How can I identify the mainboard BIOS version?

A: The AOpen mainboard BIOS version appears on the upper-left corner of the POST (Power-On Self Test) screen. Normally, it starts with R and is found in between the model name and the date. For example:



Q: How can I identify version of the mainboard?

A: The AOpen mainboard version appears as ppppp-x on the PCB, near the PCI slot and is enclosed in a white bordered box. The ppppp is the project code used by AOpen internally and -x is the version code. For example, for AP5T with 95152 project code and -1 version code, the mainboard version appears on the PCB as follows:



Frequently Asked Questions

Q: Why the AOpen mainboards (MB) do not have cache module expansion slot?

A: Faster CPU speed requires more difficult and complex MB timing design. Every trace and components delay must be taken into consideration. The expansion cache slot design will cause 2 or 3ns delay in PBSRAM timing, and the extended trace length to the cache module through the golden finger will further delay the timing by 1 or 2ns. This may result in unreliable system once the cache module and slot becomes worn. All AOpen MBs support 512KB PBSRAM onboard. For better performance (around 3% higher than 256KB), we strongly recommend you to use 512KB onboard. Otherwise, reliable 256KB is better than unreliable 512KB with cache module. AOpen is the first company to promote this concept since the fourth quarter of 1995.

Q: What is MMX?

A: MMX is the new single-line multiple-instruction technology of the new Intel Pentium PP/MT (P55C) CPU. A new Pentium Pro CPU (Klamath) with MMX technology is also expected to be released soon. The MMX instructions are specifically useful for multimedia applications (such as 3D video, 3D sound, video conference). The performance can be improved if applications use these instructions. All AOpen MBs have at least dual power onboard to support PP/MT, it is not necessary to have special chipset for MMX CPU.

Q: What is USB(Universal Serial Bus)?

A: USB is a new 4-pin serial peripheral bus that is capable of cascading low/medium speed peripherals (less than 10Mbit/s) such as keyboard, mouse, joystick, scanner, printer and modem/ISDN. With USB, the traditional complex cables from back panel of your PC can be eliminated.

You need the USB driver to support USB device(s). AOpen MBs are all USB ready, you may get latest BIOS from AOpen web site (http://www.aopen.com.tw). Our latest BIOS includes the keyboard driver (called Legacy mode), that simulates USB keyboard to act as AT or PS/2 keyboard and makes it possible to use USB keyboard if you don't have driver in your OS. For other USB devices, you may get the drivers from your device vendor or from OS (such as Win95). Be sure to turn off "USB Legacy Support" in BIOS "Chipset Setup" if you have another driver in your OS.

Q: What is P1394?

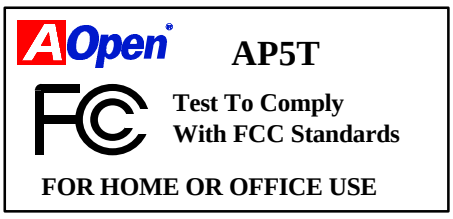
A: P1394 (IEEE 1394) is another standard of high-speed serial peripheral bus. Unlike low or medium speed USB, P1394 supports 50 to 1000Mbit/s and can be used for video camera, disk and LAN. Since P1394 is still under development, , there is no P1394 device currently available in the PC market. Also, there is no chipset that can support P1394. Probably in the near future, a card will be developed to support P1394 device.

Q: What is SMBus (System Management Bus, also called I2C bus)?

A: SMBus is a two-wire bus developed for component communication (especially for semiconductor IC). It is most useful for notebook to detect component status and replace hardware configuration pin (pull-high or pull-low). For example, disabling clock of DIMM that does not exist, or detecting battery low condition. The data transfer rate of SMBus is only 100Kbit/s, it allows one host to communicate with CPU and many masters and slaves to send/receive message. The SMBus may be used for jumpless mainboard, the components which support SMbus are not ready yet, we will keep eyes on it.

Q: What is FCCDoC (Declaration of Conformity)?

A: The DoC is new certification standard of FCC regulations. This new standard allows DIY component (such as mainboard) to apply DoC label separately without a shielding of housing. The rule to test mainboard for DoC is to remove housing and test it with regulation 47 CFR 15.31. The DoC test of mainboard is more difficult than traditional FCC test. If the mainboard passes DoC test, that means it has very low EMI radiation and you can use any kind of housing (even paper housing). Following is an example of DoC label. Currently, AOpen AX65/AP57/AP5T/AX5T had passed DoC test.



Q: What is PBSRAM (Pipelined Burst SRAM)?

A: For Pentium CPU, the Burst means reading four QWord (Quad-word, 4x16 = 64 bits) continuously with only the first address decoded by SRAM. The PBSRAM will automatically send the remaining three QWord to CPU according to predefined sequence. The normal address decoding time for SRAM is 2 to 3 clocks. This makes the CPU data read timing of four QWord to be at least 3-2-2-2 and a total of 9 clocks if traditional asynchronous SRAM is used. However, with PBSRAM, there is no need to decode address for rest three Qword. Therefore, data read timing can be 3-1-1-1, that is equivalent to 6 clocks and is faster than asynchronous SRAM.

Q: What is EDO (Extended Data Output) memory?

A: The EDO DRAM technology of EDO is actually very similar to FPM (Fast Page Mode). Unlike traditional FPM that tri-states the memory output data to start the pre-charge activity, EDO DRAM holds the memory data valid until the next memory access cycle, that is similar to pipeline effect and reduces one clock state.

Q: What is SDRAM (Synchronous DRAM)?

A: The SDRAM is a new generation DRAM technology that allows DRAM to use the same clock as the CPU host bus (EDO and FPM are asynchronous and do not have clock signal). The idea is the same as "Burst" (refer to the previous Q & A). It requires only one clock for the 2nd, 3rd, and 4th QWord (for example, 5-1-1-1 compares with EDO 5-2-2-2). The SDRAM comes in 64-bit 168-pin DIMM (Dual-in-line Memory Module) and operates at 3.3V. Note that some old DIMMs are made by FPM/EDO and only operate at 5V. Do not confuse them with SDRAM DIMM. AOpen is the first company to support dual-SDRAM DIMMs onboard (AP5V), from Q1 1996.

Q: Can SDRAM DIMM work together with FPM/EDO SIMM?

A: The FPM/EDO operate at 5V while SDRAM operates at 3.3V. The current MB design provides different power to DIMM and SIMM but connects the data bus together. If you combine SIMM and DIMM, the system will still work fine; however, only temporarily. After a few months, the SDRAM 3.3V data input will be damaged by 5V FPM/EDO data output line. Therefore, we strongly NOT recommend DIMM and SIMM combined together. There is one exception, if your SDRAM supports 5V tolerance (such as TI or Samsung), which accepts 5V signal at 3.3V operating power, you can combine them.

Manufacturer	Model	Suggested CAS	5V Tolerance

		Latency Time	
Samsung	KM416S1120AT-G12	2	Yes
NEC	D4516161G5-A12-7JF	2	No
Micron	MT4LC1M16E5TG-6	2	No
TI	TMS626162DGE -15	2	Yes
TI	TMS626162DGE M-67	3	Yes

Q: What kind of SDRAM have been tested on AP5T/AX5T?

A: There is an important parameter affects SDRAM performance, CAS Latency Time. It is similar as CAS Access Time of EDO DRAM and is calculated as number of clock state. INTEL TX chipset support 2 or 3 clocks CAS Latency Time, and the default timing is set to 2 clocks. However, there is SDRAM which can not meet requirement of INTEL TX chipset. The SDRAM that AOpen had tested are listed below. If your SDRAM has unstable problem, go into BIOS setup→ Chipset Features → SDRAM(CAS Lat/RAS-to-CAS), change 2/2 to 3/3, which means 3 clocks CAS Latency.

Manufacturer	Model	Suggested CAS Latency Time	5V Tolerance
Samsung	KM416S1120AT-G12	2	Yes
NEC	D4516161G5-A12-7JF	2	No
Micron	MT4LC1M16E5TG-6	2	No
TI	TMS626162DGE -15	2	Yes
TI	TMS626162DGE M-67	3	Yes

Q: What is Bus Master IDE (DMA mode)?

A: The traditional PIO (Programmable I/O) IDE requires the CPU to involve in all the activities of the IDE access including waiting for the mechanical events. To reduce the workload of the CPU, the bus master IDE device transfers data from/to memory without interrupting CPU, and releases CPU to operate concurrently while data is transferring between memory and IDE device. You need the bus master IDE driver and the bus master IDE HDD to support bus master IDE mode. Note that it is different with master/slave mode of the IDE device connection. For more details, refer to section 2.3 "Connectors".

Q: What is 3.3V Over-current Protection?

A: The Over-current Protection was very popular implemented on the Baby AT or ATX +5V/+12V switching power supply. It is very useful to prevent accident short circuit when you install the mainboard, HDD, add-on cards into housing. But unfortunately, the new generation CPU and chipset use 3.3V or 2.8V voltage which has regulator to transfer 5V to 3.3V/2.8V, and makes 5V over-current protection useless. AOpen TX mainboard AP5T/AX5T with switching regulator onboard support 3.3V (Vcpuio, chipset, PBSRAM, SDRAM) and 2.8V (CPUVcore) over-current protection, in conjunction with 5V/12V power supply provide the full line over-current protection.

Q: What is CPU Thermal Protection?

A: The higher speed of CPU , the more heat dissipation need to be taking into consideration. If user does not use correct fan for the CPU cooling, it is highly possible the CPU can over heat and causing system unstable. AOpen AP5T/AX5T/AX6F has special thermal detection circuit under the CPU, and slow down the CPU speed as well as warning when temperature is high then a predefined temperature. (Normally, 55 degree C.)

Q: What is the difference between AP5T-1, AP5T-2 and AP5T-3?

A: For the convenience of over-clocking user, AP5T-2 adds jumper (JP5) for 75/83.3MHz external CPU bus clock. All the circuit and components remain unchanged (including clock generator). The user set clock to 75/83.3MHz is taking his own risk, and is probably to have system unstable behavior. There are also more features implemented on AP5T-3.

Item	AP5T-3	AP5T-2	AP5T-1
Support 75/83.3MHz	Yes	Yes	No
Onboard Power Regulator	Switching	Linear	Linear
3.3V, 2.8V/2.9V Over-current protection	Yes	No	No
CPU Thermal Protection	Yes	No	No

Q: What is the Ultra DMA/33?

A: This is the new specification to improve IDE HDD data transfer rate. Unlike traditional PIO mode, which only uses the rising edge of IDE command signal to transfer data, the DMA/33 uses both rising edge and falling edge. Hence, the data transfer rate is double of the PIO mode 4 or DMA mode 2. (16.6MB/s x2 = 33MB/s).

The following table lists the transfer rate of IDE PIO and DMA modes. The IDE bus is 16-bit, which means every transfer is two bytes.

Mode	Clock per 33MHz PCI	Clock count	Cycle time	Data Transfer rate
PIO mode 0	30ns	20	600ns	(1/600ns) x 2byte = 3.3MB/s
PIO mode 1	30ns	13	383ns	(1/383ns) x 2byte = 5.2MB/s
PIO mode 2	30ns	8	240ns	(1/240ns) x 2byte = 8.3MB/s
PIO mode 3	30ns	6	180ns	(1/180ns) x 2byte = 11.1MB/s
PIO mode 4	30ns	4	120ns	(1/120ns) x 2byte = 16.6MB/s
DMA mode 0	30ns	16	480ns	(1/480ns) x 2byte = 4.16MB/s
DMA mode 1	30ns	5	150ns	(1/150ns) x 2byte = 13.3MB/s
DMA mode 2	30ns	4	120ns	(1/120ns) x 2byte = 16.6MB/s
DMA/33	30ns	4	120ns	(1/120ns) x 2byte x2 = 33MB/s

Q: What is the performance of Ultra DMA/33? Do we need special driver?

A: Currently (Jan 1997), the only Ultra DMA/33 HDD we can test is Quantum 1620AT. It is only a lab pilot run sample and has not been tuned to best performance. The final sample will probably be ready in the middle of Feb. You need driver to activate DMA/33, there are now driver from INTEL or you can use driver in the Windows 95 Memphis, which can recognize South Bridge PIIX4.

Model	OS/Driver	Mode	Winbench96 Diskwinmark
Quantum 1620AT	Windows 95 OSR2	PIO mode 4	1330
Quantum 1620AT	Windows 95 OSR2	DMA mode 2	1300
Quantum 1620AT	Windows 95 OSR2 + INTEL driver	DMA/33	1280
Quantum 1620AT	Windows 95 Memphis	PIO mode 4	1280
Quantum 1620AT	Windows 95 Memphis	DMA/33	1330

Q: What is PnP (Plug and Play)?

A: In the past, the IRQ/DMA and memory or I/O space of add-on cards are normally set manually, i.e., by jumper or by proprietary utility. The user has to check the user's guide for the correct setting. Sometimes, resource conflict occurs and this leads to unstable system. The PnP specification suggests a standard register interface for both BIOS and OS (such as Win95). These registers are used by BIOS and OS to configure system resource and prevent any conflicts. The IRQ/DMA/Memory will be automatically allocated by PnP BIOS or OS.

Currently, almost all the PCI cards and most ISA cards are PnP compliant. If you are still using a Legacy ISA card that cannot support PnP, set the corresponding resource (IRQ/DMA/memory) to ISA in the BIOS "PCI/PnP Setup".

Q: What is ACPI (Advanced Configuration & Power Interface) and OnNow?

A: The ACPI is new power management specification of 1997 (PC97). It intends to save more power by taking full control of power management to operating system and not through BIOS. Because of this, the chipset or super I/O chip needs to provide standard register interface to OS (such as Win97) and provides the ability for OS to shutdown and resume power of different part of chip. The idea is a bit similar to the PnP register interface.

ACPI defines momentary soft power switch to control the power state transition. Most likely, it uses the ATX form factor with momentary soft power switch. The most attractive part of ACPI for desktop user is probably the "OnNow" feature, an idea from notebook. This feature allows you to

immediately resume to your original work without the long time waiting from bootup, entering Win95 and running Winword. The AX5T with Intel TX chipset can support ACPI.

Q: What is ATX Soft Power On/Off and Momentary Switch?

A: The Soft Power On of the ATX specification means to provide a standby current for special circuit to wait for wakeup event when main power is off. For example, Infrared wakeup, modem wakeup, or voice wakeup. Currently, the most simple usage is to provide standby current for power switch circuit so that power switch can turn on/off the main power through soft power control pin. The ATX power specification does not mention anything about the power switch type. You can use toggle or momentary switch, note that ACPI specification requires momentary switch for power state control. All the AOpen ATX MBs support momentary switch and AX5T/AX58/AX6L support modem wakeup (Modem Ring-On).

Soft Power Off means to turn off system through software, Windows 95 Shutdown function can be used to verify if your mainboard supports soft power off. AOpen AX5T/AX58/AX6F/AX6L support soft power off.

Q: What is the Modem Wake Up?

A: With the help ATX soft power On/Off and Suspend to Hard Drive, it is possible to have system totally power off (The traditional green PC suspend mode does not really turn off the system power supply), and wakeup to automatically answer a phone call such as answering machine or to send/receive fax. You may identify the true power off by checking fan of your power supply. Both external box modem and internal modem card can be used to support Modem Wake Up, but if you use external modem, you have to keep the box modem always power-on. AOpen AX5T/AX58 and internal modem card implement special circuit (patent applied) and make sure the modem card works properly without any power. We recommend you choose AOpen modem card (F34I or MP32) for Modem Wake Up applications.

Q: What is the AGP (Accelerated Graphic Port)?

A: AGP is a PCI-like bus interface targeted for high-performance 3D graphic. AGP supports only memory read/write operation and single-master single-slave one-to-one only. The AGP uses both rising and falling edge of the 66MHz clock and produces 66MHz x 4byte x 2 = 528MB/s data transfer rate. The AOpen AX6L MB are designed to support AGP via the new Intel Klamath LX chipset.

Frequently Asked Questions

Q: Which Pentium chipset has the best performance?

A: The performance difference of chipset depends on what kind of DRAM they use and the DRAM timing they support. (They all use PBSRAM, so that the difference is very little at 2nd level cache.)

The following table lists the read timing of current available chipsets. The four digital represents the clocks needed for 1st-2nd-3rd-4th QWord. Notice that the Intel HX + EDO or SIS 5571+ EDO are almost the same as VX + SDRAM and the TX + SDRAM has the best performance among Pentium chipsets. Please note AP57 does not support SDRAM.

P5 Chipset	Model	PBSRAM	FPM	EDO	SDRAM
Intel 430FX	AP5C/P	3-1-1-1	7-3-3-3	7-2-2-2	NA
Intel 430VX	AP5VM/ AP5V	3-1-1-1	6-3-3-3	6-2-2-2	6-1-1-1
Intel 430HX	AP53/ AP5K/ AX53	3-1-1-1	6-3-3-3	5-2-2-2	NA
Intel 430TX	AP5T/ AX5T	3-1-1-1	6-3-3-3	5-2-2-2	**5-1-1-1**
SIS 5571	AP57	3-1-1-1	5-3-3-3	4/5-2-2-2	(6/7-1-1-1)
SIS 5582	AP58/ AX58	3-1-1-1	5-3-3-3	4/5-2-2-2	6/7-1-1-1

Q: What is the memory performance improvement of TX chipset?

A: Following is the compare table of TX+SDRAM, VX+SDRAM, TX+EDO, HX+EDO and VX+EDO.

CPU : Pentium PP/MT (P55C) 200MHz

DRAM :16MB EDO or SDRAM

HDD : Quantum Fireball 1280AT

VGA : AOpen PV60 S3 Trio64V+ 800x600x256 Small font

OS : Windows 95 OSR2

Chipset	Model	DRAM	Timing	Winstone96
Intel 430VX	AP5VM	EDO	6-2-2-2	86.1
Intel 430HX	AP53/AP5K	EDO	5-2-2-2	86.8
Intel 430TX	AP5T/AX5T	EDO	5-2-2-2	87.3
Intel 430VX	AP5VM/AP5V	SDRAM	6-1-1-1	86.6
Intel 430TX	AP5T/AX5T	SDRAM	5-1-1-1	87.7

Q: Does Pentium or Pentium Pro MB support Deturbo mode?

A: The Deturbo mode was originally designed to slow down CPU speed for old applications (especially old games). It uses programming loop to wait or delay special event. This programming method is considered very bad since the delay of loop highly depends on the CPU speed and the application fails at high-speed CPU. Almost all new applications (including games) use RTC or interrupt to wait event. There is no need for Deturbo mode now. The Turbo switch is now used as Suspend switch. However, some MBs still support Turbo/Deturbo function via keyboard. You can set the system to Deturbo by pressing <Ctrl> <Alt> <->. To back to Turbo mode, press <Ctrl> <Alt> <+>. Note that the Deturbo mode has been removed in new MBs since these require more code space in Flash ROM.

Q: Power Management Icon does not appear in the Windows 95 Control Panel even though the APM under BIOS Setup is enabled.

A: This problem occurs if you did not enable the APM function before you install Windows 95. If you have already installed Windows 95, re-install it after the BIOS APM function is enabled.

Q: Why does the system fail to go into suspend mode under Win95?

A: This problem may be caused by your CDROM settings. The CDROM Auto Insert Notification of Win95 is dafault enabled, the system will continue to monitor your CDROM, auto-execute application when a CD diskette is loaded, and prevents the system from entering into suspend mode. To resolve this, go into Control Panel → System → Device Manager → CDROM → Setting, and disable the "Auto Insert Notification" function.

Q: What is Windows 95 Registry?

A: The functions of Windows 95 Registry and the Windows 3.1 INI files are almost the same. Both store the hardware and software configurations. The only difference is that Registry is a database while INI is text file. You can run REGEDIT.EXE to further understand the Registry structure. Checking and studying the structure of this file will help you solve some configuration problems.

Q: Why are there question marks or "standard IDE controller" presented under Device Manager after installing Win'95 on AP5T/AX5T based system?

A: Intel has introduced 430TX chipset with latest feature of "ACPI", "USB" & "Ultra DMA/33". Since these devices are so new that Win'95 did not anticipate to support them on Aug. of '95 which Win'95 initially is being released. Under Win'95 Device Manager, you may see following devices installed:

-Other Devices

? PCI Bridge

? PCI Card (or PCI Universal Serial Devices)

-Hard Disk Controllers

Standard Dual PCI IDE Controller

Primary IDE Controller

Secondary IDE Controller

PCI Bridge:

This device stands for the "ACPI" feature which implemented within PIIX4(82371AB) chipset. This new feature is expected to be fully utilized under Windows'97(Memphis). Please look for more details on ACPI from FAQ "What is ACPI?".

PCI Card:

There is driver necessary in order to support Universal Serial Device under Win'95. Microsoft has implemented the driver since Win'95 OEM Service Release 2.1 (OSR 2.1) & it will recognize USB port without any problem. Please contact your USB device vendor or system vendor of more information. Also, more details for USB in the FAQ of "What is USB?".

Standard Dual PCI IDE Controller:

The IDE controller chipset -- PIIX4 -- will be fully recognized under Windows'97 also. In the mean while, you may download the driver for Win'95 from AOpen homepage at 'http://www.aopen.com.tw" which supports both Bus Mastering & Ultra DMA/33. After installation, you should be able to see Win'95 recognize it under Device Manager as below:

-Hard Disk Controllers

Intel 82371AB PCI Bus Master IDE Controller

Primary Bus Master IDE Controller

Secondary Bus Master IDE Controller

Even though all of above are the current limitations of Win'95 on Intel 430TX chipset which are expected to implement on Win'97, your system still can enjoy the best performance of AP5T/AX5T without any problem.

Q: Which version of the Windows '95 that I am using?

A: You may determine the version of Windows '95 by following steps.

1. Double click "System" in "Control Panel".
2. Click "General".
3. Look for "System" heading & refer to following,

4.00.950	Windows 95
4.00.950A	Windows 95 + Service Pack or OEM Service Release 1
4.00.950B	OEM Service Release 2 or OEM Service Release 2.1

If you are running OSR 2.1, you may tell it from by checking "USB Supplement to OSR2" in the list of installed program of Add/Remove program tool under Control Panel, and checking for version 4.03.1212 of the Ntkern.vxd file in the Windows\System\Vmm32 folder.